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# Medical Times

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## General Scientific

### GALL STONE DISEASE COMPLICATING PREGNANCY.


AIME PAUL HEINECK, M. D.,
Chicago, Ill.


During gestation, women are subject to many surgical conditions. The safety of the product of conception, the safety of the mother, demand that our knowledge of these surgical ailments be increased. Definite and accurate conclusions should be formulated as to the most opportune, most appropriate, and therefore the most scientific treatment of any and all surgical states complicating pregnancy. In previous contributions, we stated that every case of ectopic pregnancy, irrespective of type or stage of development, calls for the immediate ablation of the ectopic ovum. Immediate operative removal of the ectopic ovum terminates the gestation and protects the mother from the morbidity and fatality incident to extra-uterine pregnancy.

In other contributions, also published in these columns, we urged that every case of appendicitis complicating pregnancy be subjected to operation during gestation. Appendicitis is a surgical disease: when it complicates pregnancy, it calls for the immediate operative removal of the inflamed appendix, irrespective of the type of inflammation, irrespective of the age of the pregnancy. In women, previous to and during the child-bearing period, the non-operative treatment of appendicitis invites disaster, immediate, remote, or both. The timely removal of the inflamed appendix to a great extent protects the mother from the complications and sequelae, from the morbidity and mortality, incident to appendicitis. Operative removal of a diseased appendix does not interrupt gestation, does not exert any unfavorable influence on delivery.

The frequency of cholelithiasis makes this condition one of great practical interest. In the collective statistics of nineteen European and American authors, 80,802 necropsies, the frequency averaged 5.94 per cent. (Hesse.) As the manifestations of gall-stone disease are often unrecognized, misinterpreted, or misdiagnosed, its incidence is greater than is supposed, is far greater than the number of reported cases would lead us to believe. It occurs in both sexes and at all ages, in the fat, in the lean, in the weak, and in the strong. The older the patient, the more liable is he or she to have gall-stones. "Gall-bladder disease is pre-eminently a disease of the middle-aged female, but is by no means confined to that age or sex."—Deaver.

Gall-stone disease is of common occurrence during pregnancy, during the puerperium, during lactation. In fact, its greatest incidence is in the child-bearing period. Statistics have established beyond dispute that gall-stone disease, latent or manifest, is more common in women than in men. Out of 655 patients laparotomized for gall-stones, 536 were women, 119 men (Kehr). Of 1,244 women operated upon for uterine myomata at the Mayo Clinic, 92, or 7.1 per cent., had gall-stones.

Statistics of 920 cases of cholelithiasis (E. Grube):

| Age ..... | 10-21 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 |
|---|---|---|---|---|---|---|---|
| Male ..... | 2 | 6 | 44 | 55 | 38 | 6 | 5 |
| Female ..... | 8 | 114 | 213 | 215 | 148 | 52 | 14 |
| Unmarried women .... | 6 | 24 | 27 | 27 | 19 | 2 | 2 |
| Married, with children ... | 1 | 82 | 177 | 176 | 124 | 44 | 9 |
| Married, without children | 1 | 8 | 9 | 12 | 5 | 6 | 3 |

Unquestionably child-bearing has something to do with the frequency of gall-stones in that state. Cholelithiasis may complicate a pregnancy otherwise normal; it has been found associated with ectopic gestation (Brothers). It occurs in primiparae (Heineck), deutoparae (Barillon), multiparae, VIII-para (Roith), IX-para (Graham). Manifestations of cholelithiasis may precede, coincide with, or follow an abortion or a premature labor. In seven of the analyzed cases, there was a history of one or more abortions, accidental or induced; Watson, one; Villard, two; Peterson, six; Brothers, ten. Gall-stone disease may become manifest and necessitate operative relief at any period of gestation: second month (Bosse), third month (Roith), fifth month (Mack), sixth month (Moulden), seventh month (Davis). In a large number of cases the initial symptoms first occur during the child-bearing period (Rudeaux). Our cases can be classified according to patient's age at time of operation as follows: The youngest was 21 years old (Villard), the oldest 42 years (Amann). From 25-29 years, inclusive, 19 patients; 30-35 years, inclusive, 11 patients; 36-40 years, inclusive, 5 patients. Ploger reports cases in which there was a definite aggravation of symptoms during

pregnancy; Naxera reports eight cases in which the first attacks of biliary colic occurred during gestation. "Seventy-five per cent. of gall-stones are found in women, and in 80 per cent. of these patients the symptoms developed during pregnancy" (Torrance.) Gall-stones are more commonly found in women who have borne children than in those who have remained sterile. Osler, quoting Naunyn, states that 90 per cent. of women with gall-stones have borne children. "Eighty-four per cent. of 135 women with gall-stones had borne children" (Peterson).

The literature of the subject contains case reports like the following: In an empyematous gall-bladder, associated with pericholecystitis, perforation from stones occurred during labor. Two days later the patient was operated, and thorough drainage was instituted; sepsis developed. Death occurred on the third post-operative day (Rose). Rupture of a calculous gall-bladder can occur previous to, during, or after labor. Pinard successfully operated a case of calculous cholecystitis on the eleventh day of the puerperium. Vineberg incised the gall-bladder in two cases of acute cholecystitis, in one case on the tenth day, in the other on the 12th day after delivery, and removed numerous small stones therefrom. Both cases recovered. In the same report he discusses a case of acute diffuse peritonitis consecutive to a ruptured gall-bladder, supervening a few hours after normal delivery. The condition was too grave to warrant surgical intervention. Death resulted twenty-four hours later. This patient had had, during her pregnancy, several attacks of biliary colic; her distended gall-bladder had been mapped out. Potocki's patient, a deutopara in the 8½ month of a normal pregnancy, had a sudden attack of right hypochondriac pain, nausea, vomiting, etc. Labor having started, the patient was delivered of a living, normal child. Eleven hours after the termination of labor, a cholecystostomy was performed; the gall-bladder contained pus and numerous calculi. Drainage. Recovery. In the discussion provoked by Graham's case, there was reported a case of death from general peritonitis due to rupture of the gall-bladder during labor. The post mortem revealed the rupture and 250 stones scattered about in the abdomen. Medical attendants should keep in mind that fever during the puerperium can be due to causes other than puerperal fever: appendicitis, gall-bladder disease, etc.

Greater familiarity with the symptomatology, clinical course, and treatment of cholelithiasis complicating pregnancy will lessen the frequency of occurrences such as the preceding, and will also qualify us to combat successfully the various manifestations of gall-stone disease. I have analyzed and studied all the cases of undoubted gall-stone disease complicating pregnancy, reported with sufficient data, thirty cases in all, in the French, English, and German medical literature, during the years 1900-1918, inclusive.* Many more cases were studied, but owing to the fact that they are not reported with sufficient detail, they have influenced our conclusions only in a general way. In each case the diagnosis was verified either at the time of operation, or at the outopsy.

## Etiology.

The cause of gall-stone disease is not definitely known. Numerous theories have been advanced; not one has, as yet, been found worthy of general acceptance. The following three factors, owing to their frequency previous to or during the existence of gall-stone disease, impress one forcibly as being important predisposing causes. In the individual case, one, two, or all of these three favoring influences may be operative:

a. Conditions associated with, favoring, or causing biliary stasis.

b. Inflammatory states of the biliary tract, primary or secondary to local disease, or to some general febrile state.

c. Regimens or diatheses favoring or causing hypercholesterinaemia.

Cholesterin, the principal component of gall-stones, is derived from the bile. Simple bile-stasis can, through the precipitation of cholesterin, lead to cholesterin-stone formation. Precipitation is prone to occur in inspissated bile, and the elements thrown down may lead to stone formation. In the later months of pregnancy, the abdominal muscles and the diaphragm contract feebly, and the bile, being inefficiently expelled, stagnates in the gall-bladder.

Stasis, in addition to separating out the essential constituents of gall-stones from the bile, favors the growth of bacteria in the residual fluid. According to Sherrington, bacteria cannot enter the bile ducts, as long as the bile is expelled at regular intervals. Bile is not an antiseptic; it does not prevent the development of bacteria; left exposed to bacterial contamination, it undergoes putrefaction. Obstruction to the bile outflow may be due to foreign bodies present in the gall-bladder, or, in the larger bile ducts, may be determined by inflammatory or other degenerative changes involving the gall-bladder or the bile ducts, or may result from such pathological states of contiguous organs as lead to impingement of one or more of the latter upon the bile ducts. Obesity, sedentary life, constipation, tight clothing, such as ill-fitting and improper corsets, etc., are held by some to be predisposing factors. Miyake believes that the non-wearing of corsets by Japanese women is one of the principal reasons why gall-stones are so infrequent among them.

Bacterial organisms are said to be the most essential cause in the majority of cases of gall-stones. In this connection one should not ignore the relation of mouth and teeth infections to appendicitis and cholecystitis. In some cases, supplementing the noxious influence of bile stasis, in others acting independently, in many acting conjointly, there is present a bacterial inflammation of the mucous membrane of the gall-bladder, of the bile ducts, or of both. If the stone be of aseptic origin, the abnormal element lies in the composition of the bile; if the stone be of inflammatory origin, the pathological condition is the cholecystitis or catarrh of the gall-bladder.

A history of acute cholecystitis first observed within a few weeks or months of parturition is given by many of the patients operated upon for gall-stone disease. Both pregnancy and the puerperium are not infrequently complicated by acute exacerbations or recurrences of cholecystitis. (Bettman.) The gastro-intestinal disturbances and constipation that attend the pregnant state no doubt favor the migration of the bacillus coli to the gall-bladder.

Although infection and retarded bile outflow predispose to gall-stone formation, they are not all-sufficient. Occlusion of the cystic or of the common duct may co-exist with an infected gall-bladder, and yet no gall-stones form. In order to produce calculi, infections of the gall-bladder must be of low type: colon bacillus, bacillus typhosus, staphylococcus, etc. Typhoid fever is considered an important etiological factor; it

*All the periodicals to be found at the John Crerar Library, Chicago, Ill.

occurs in all lands and among all races, still gall-stones are very uncommon in the tropics; typhoid fever is less prevalent than formerly, but there seems to be no decrease in the number of patients having gall-stones.

Diathetic conditions can so alter the composition of the bile as to favor, suitable local conditions existing, the production of calculi. The supposition is that gall-stones are deposited as a result of error in metabolism (overconcentration of cholesterin in blood and bile). Aschoff's theory of gall-stone formation can be stated briefly, as follows: Cholesterin is a normal constituent of the bile and of the blood, its amount therein depending upon the amount of cholesterin in the food. A diet rich in fats and albuminous foods raises the cholesterin content of the bile. There is a distinct cholesterin diathesis. Persons with this diathesis, even upon an ordinary diet, retain their lipoids; an increased cholesterin content of the blood and of the bile results, and sooner or later a sudden precipitation of the bile cholesterin in the form of gall-stones may occur. Stones are often present in patients with no excess of cholesterin in their blood—the cholesterin shower having occurred at some previous time.

While in the pregnant woman the presence of hypercholesterinaemia, associated with a clinical history of gall-stones, is strongly suggestive of cholelithiasis, a low cholesterin figure does not prove the absence of gall-stones. The cholesterol increase becomes manifest during the later half of gestation. (Slemons and Curtis.)

The sedentary life of the pregnant woman and the encroachment of the enlarging pregnant uterus upon the liver and its biliary passages favor bile stasis. The normal obstetric patient eliminates less, during the entire period of gestation, than the normal non-pregnant woman. There is no well-recognized line of demarcation between normal and pathologic pregnancy. During pregnancy, the foetal metabolism throws extra work upon the maternal liver; this may determine a temporary impairment of function, an hepatic insufficiency, evidenced by urobilinura, alimentary glycosuria, moderate icterus, etc. This added stress also predisposes the liver to local changes, evidenced by "the liver of pregnancy," icterus gravidarum, acute yellow atrophy of the liver, etc. The factors enumerated above, taken in connection with the fact that the bile and blood of pregnant women contain more cholesterin than the bile and blood of men or non-pregnant women, explain in part the greater frequency of gallstones in child-bearing women, explain in part the undeniable estiological influence of pregnancy in gall-stone formation.

**Pathology.**

One, two, three, or more biliary calculi may be present in the same patient. From a pregnant patient Moulden removed 17 biliary calculi, Bosse 26, Graham 80 odd, Roith 84, Finkelstone 86, Brothers 250. In reporting his case, Davis says the calculi were "too numerous to count."

Gall-stones vary in volume, in shape, in location. Bishop says that in his case the calculi were "like fig-seed"; Mack, that they were "pea-shaped"; Barillon, "mulberry-shaped"; Peterson, "facetted." In Rissmann's case the calculus was large, long and elliptical; in Roith's, pigeon egg sized. In many of the cases, where numerous, the calculi were pea-sized.

Gall-stones usually develop in the gall-bladder, rarely in any other portion of the biliary tract. In their wandering, they may lodge in the hepatic duct, in the cystic duct:—"Seventeen stones were scooped out of the dilated cystic duct" (Moulden); (later Moulden re-operated his patient, opened the duodenum and removed five small stones from the ampulla of Vater); in the common duct (Ploger), in the duodenal end of the common duct, including the ampulla of Vater (Rissmann). "Autopsy showed stones in hepatic duct and in common duct" (Peterson). From a VI-para, two months pregnant, Bosse removed one gall-stone from the common duct and twenty-five from the gall-bladder.

Stones may precede the presence of inflammatory changes in the gall-bladder, may be associated with and be the cause or effect of inflammation, slight, moderate, or severe. The inflammation may be limited to the gall-bladder (cholecystitis), to the larger ducts (cholangitis), it may spread to the finer radicles of the biliary tract (diffuse cholangitis), or may be diffuse, involving the gall-bladder and the biliary passages. Cholelithiasis may result from a cholecystitis, and, once established, it becomes a factor in the maintenance of the cholecystitis, in the causation of recurrent attacks of cholecystitis. Inflammation of the gall-bladder and bile ducts is acute or chronic, ulcerative, perforative, or adhesive, catarrhal, phlegmonous, suppurative, or gangrenous. It may be limited to the mucous membrane, or involve part (Davis), or the entire thickness of the gall-bladder wall. In the latter case, adhesions are very liable to form between the gall-bladder and one or more contiguous organs. The exudate accompanying these inflammations is mucous, serous, sero-fibrinous, or purulent (Graham) in nature. "Gall-bladder, in addition to calculi, contained 200 cu.cm. of pus" (Moulden). If perforation or rupture of a gall-bladder occur, the stones therein present may escape, either into the peritoneal cavity, or into a mass of adhesions, or into the liver substance.

Graham, operating for a ruptured gall-bladder, a IV-para, six months pregnant, removed three stones from the peritoneal cavity, one from the gall-bladder, and two from the cystic duct. Should the inflamed gall-bladder become adherent to a neighboring viscus, the resulting adhesions may cause functional impairment, or an internal fistula may result, through which the gall-stones may escape; if the gall-bladder become adherent to the abdominal wall, the inflammation may involve the latter, and lead to the formation of an inflammatory mass, from which, ultimately, an external biliary fistula may result.

Amann's patient, a multipara, in the fifth month of pregnancy, noticed a painful mass, supposedly a fibroma, developing in the hepatic region. She went through a normal labor and three months later this painful tumor mass was successfully removed. It had resulted from a pericholecystic inflammatory process extending to and involving the contiguous abdominal wall and the appendix vermiformis, and it consisted of a ruptured gall-bladder and an extruded gall-stone, an appendix, and an inflammatory tissue mass.

Impaction of a stone in the cystic duct may lead to:

1. Dilatation of the gall-bladder, and a resulting (a) simple hydrops (the wall of the gall-bladder may be greatly thickened; may be paper-thin; may be almost transparent.) (b) Empyema.

2. Acute or chronic cholecystitis; catarrhal, serous, sero-fibrinous, suppurative, gangrenous, phlegmonous, ulcerative, perforative, adhesive.

3. Sclerosis of the gall-bladder; atrophic, hypertrophic.

4. Calcification of the gall-bladder.

If the calculus becomes impacted in the common

duct there may result any of the fore-mentioned complications or a distention of the common duct (Bosse), with or without a cholangitis.

Inflammation in the common duct involving contiguous tissues may produce a thrombo-phlebilis and thus interfere with the circulation through the liver, may extend to the head of the pancreas, changing it to a firm tumor. (Finkelstone.) In his case Max Neu found the gall-bladder shrunken, the common duct widened and bound down by broad inflammatory adhesions to the duodenum.

### Symptoms.

Moynihan, Mayo, and many other careful clinical observers are of the opinion that gall-stones do not exist without producing symptoms; they state that the vague term "indigestion" is used variously by patients to indicate all the several forms of distress which are the forerunners of a crisis of acute biliary colic. Parks claims that the statement "may not cause symptoms" is an admission of inability to recognize incipient symptoms.

Gall-stones produce symptoms by irritation, by migration, by obstruction. Pain and tenderness are most constant and most important symptoms of cholelithiasis, being described by the patients under a variety of terms: *a.* discomfort (Roith), *b.* deep soreness (Villard), *c.* biliousness, *d.* dyspepsia, *e.* gastric distress (Barillon), *f.* neuralgia. The pain, usually limited to the region of the gall-bladder, radiates quite often to the epigastrium, subscapular region, neck, shoulders, arms, etc. "Pain in hepatic region," Bosse. "Pain in right hypochondrium, extending to right shoulder," Davis. "Repeated attacks of pain under the right scapula, extending around to the epigastrium," Bishop. "Lancinating pain in epigastrium radiating to back under the shoulder blade," Moulden. "Sudden attack of pain in region of navel," Roith. "Pain in right hypochondrium, radiating to shoulder and to back," Villard.

What causes this pain? Various factors, chief among which are: *a.* the calculi themselves; *b.* the inflammation present in the gall-bladder and in the biliary tracts; *c.* adhesions of inflammatory origin binding the gall-bladder, cystic or common duct to adjacent organs. These adhesions can also determine severe functional disturbances of stomach and intestines.

"The most characteristic and constant sign of gall-bladder hypersensitiveness is the inability of the patient to take a full inspiration when the physician's fingers are hooked up deep beneath the right costal arch below the hepatic margin. The diaphragm forces the liver down until the sensitive gall-bladder reaches the examining fingers, when the inspiration suddenly ceases as though it had been shut off. I have never found this sign absent in case of calculus or in infectious cases of gall-bladder disease."—Murphy.

The localized tenderness and the rigidity of the abdominal wall may be so marked that satisfactory palpation is difficult, impossible. Other factors, thick abdominal wall, meteorism, deep-seated location of the gall-bladder, may prevent the detection of the latter. In a few cases, however, a gall-bladder distended by calculi (Peterson, Roith), or by fluid, mucus, purulent, etc., in nature, or by both calculi and fluid (Villard), can easily be mapped out. A gall-bladder contracted by inflammation does not give rise to palpable tumor.

### Jaundice.

In the diagnosis of gall-stone disease, too much significance has been attached to the symptom jaundice. It is an important sign, but is not to be considered essential to diagnosis; like hemorrhage in duodenal ulcer, it ought not to be waited for. Jaundice may not occur at all (Heineck, Finkelstone), it may be inconspicuous, it may be late, it may be inconstant. In some cases each attack of gall-stone colic is followed by transient jaundice. (Bishop.) The presence of jaundice was definitely recorded in twenty of our thirty cases. The jaundice was accompanied by its usual concomitant manifestations, digestive disturbances (Villard), beer-brown urine (Bosse, Davis, etc.), clay-colored stools (Ploger, Rissmann, etc.).

In diseases of the biliary passages, icterus is of two forms; it is of inflammatory or of lithogenous origin. The cause of the first is an inflammatory swelling of the mucous membrane of the biliary passages (Korte, Barillon). In gall-bladder infections, the swelling of the mucous membrane may extend and involve the common and hepatic ducts and thereby obstruct the bile flow. The mechanical occlusions, partial or complete, of the common duct by a calculus, causes lithogenous jaundice. Icterus is frequently due to both inflammatory and calculous obstruction.

As long as a calculus remains in the gall-bladder, or in the cystic duct, jaundice is not likely to appear. In eleven of the cases in which jaundice was observed there was present, with or without other calculi, a common duct stone. (Bosse, 3 cases; Heineck, Mack, 2, Ploger, Rissmann, M'Nee, Roith, 2 cases.) In a lesser number of cases the provocative cause was the compression of the common duct or of the extra-hepatic part of the hepatic duct by a large stone in the cystic duct, by swollen lymph-glands, by inflammatory exudates, by adhesions compressing or kinking the ducts, etc.

### Colic.

As stated before, gall-stones cause pain through the irritation, infection and inflammation that result from their impaction in the neck of the gall-bladder or in any part of the bile ducts. They also cause a characteristic lancinating pain, agonizing in nature, by meandering through the bile ducts for a shorter or longer distance and setting up a spasm of the muscular wall behind the stone. This latter pain is intense, is designated as biliary colic, and is usually accompanied by chills, frequent vomiting, white lard-like stools and bile-stained urine.

Gallstone colic can be caused by: 1. An adherent, inflamed gall-bladder containing calculi (Finkelstone), or having contained calculi; 2. An inflamed gall-bladder distended by fluid or stones, its cystic duct being occluded by inflammation or by a calculus (Barillon), or calculi; 3. The entrance into or attempted passage through some part of the ducts of a calculus, altered bile, mucus or other irritating foreign body; 4. The transit of a stone through the bile-passages. 5. Impaction of a stone in a dilated inflamed common duct or in any of its tributaries (Bosse, two cases, Ploger, Rissmann). All the cases with stone in the common duct gave a history of biliary colic.

### Diagnosis.

If the symptoms are typical, the diagnosis of gall-stone disease is easy. In addition to recognizing the condition of cholelithiasis, the surgeon should, if possible, determine the exact location of the calculi and note what pathological conditions or changes may be present. Digestive disturbances are undoubtedly the cause of most failures to recognize early gall-bladder symptoms. Cholecystitis or cholelithiasis, owing to their reflex symptoms, are often mistaken for diseases of the stomach.

By keeping in mind that much of the dyspepsia of pregnancy is from unrecognized gall-stone disease, and that gastric disturbances in pregnancy should receive careful consideration and not be regarded simply as concomitant features of the pregnant state, many diagnostic errors will be avoided. The discovery of calculi in the feces is evidence of their previous existence. It is not proof that any remain. *X*-ray pictures taken and interpreted by expert roentgenologists are of paramount importance in the diagnosis of biliary, renal or ureteral calculi. The absence of any roentgenographic shadow does not prove the absence of galll-stones. "*X*-ray revealed outline of gall-bladder filled with stones"—Peterson.

Things of importance to arrive at a diagnosis are: 1. An exact history, including the record of previous attacks of hepatic colic "Previous attacks of biliary colic"—Rissmann, Ploger. "Gave a history of having had similar attacks during her previous pregnancies"—Davis. "Previous attacks biliary colic. Three years ago, first attack of pain in hepatic region. Since then, recurrent attacks"—Bosse. 2. The location of the tenderness and pain and the nature and radiating character of the latter. 3. A thorough examination including a careful inspection and palpation of the abdomen, especially of the hypochondriac region. 4. The exclusion of such pathological conditions as simulate gall-stone disease; lead colic, renal colic, duodenal ulcer, Nephrolithiasis, chronic appendicitis, movable kidney, infection of the genital tract. Cholecystitis is frequently diagnosed appendicitis and vice versa. Gall-stone disease and appendicitis are frequently present in the same patient. Cholelithiasis may co-exist with other pathological states.

**Treatment.**

In cholelithiasis, two urgent indications are present: 1. The removal of the calculus or calculi present in the gall-bladder or ducts; 2. The cure of the inflamed condition of the bile tracts. It is agreed that gall-stones should be removed. No one nowadays treats a vesical calculus by other procedures than operation. The spontaneous passage of a calculus through the intestine may bring about a cure but other calculi usually remain in the gall-bladder and any one of them may set up an inflammatory attack. In gall-stone disease, medical treatment is purely prophylactic, merely palliative. It is not curative. Moynihan says, "I hold that once a diagnosis has been made, operation is always indicated unless there are grave reasons forbidding resort to surgery. Reasons should not be asked to support a plea for operation, but to justify any other course than this."

The earlier the patients are operated, the more prompt the relief; the more numerous, the complete recoveries. With advancing pregnancy, the technical difficulties incident to operations on the gall-bladder and bile ducts increase. In these cases we never use chloroform as a general anaesthetic; we are afraid of its action on the liver cells. We have been well pleased with the use of hard round cushion placed transversely beneath the dorso-lumbar region. One of three operations. choledochotomy, cholecystostomy, or cholecystectomy is usually performed, the type of operation selected depending, in the individual case, upon the location of the calculi and upon the nature of the associated complications. In the extraction of calculi from the bile ducts, injury of the duct and wall should be avoided. Rather than risk this, the incision in the duct should be prolonged.

If the calculus or calculi are in the hepatic or common bile duct, their removal is effected by incising the common duct; drainage is instituted through this incision. (Hepatic drainage.) Recovery followed in the three cases (Bosse, two; Ploger, one) in which this was done. Rissmann successfully removed a calculus from the duodenal end of the common duct by incising the anterior and posterior duodenal wall. In the cases in which stones were present in the gall-bladder and in the common duct, the performance of a cholecystostomy and a choledochotomy at one sitting, plus the institution of hepatic drainage gave satisfactory results. Bosse, Mack, Neu, etc. Roith, in a case in which stones were present in the common duct, removed the gall-bladder, then incised the common duct and drained through the latter. Recovery. Davis in a patient seven months pregnant performed a cholecystectomy. Forty-five days later the uterus was dilated manually and a premature fetus was extracted. In all of the other cases a cholecystostomy was performed. Finkelstone in his case did a cholecystostomy; one year later he performed a cholecystectomy. In some cases, owing to the coexistence of other pathological states, additional operative work was done. There were two deaths (Graham, Peterson), in the series of cases under consideration. In Graham's case, the patient, at time of operation, had a general peritonitis from her ruptured gall-bladder. In Peterson's case, there was considerable blood oozing (the coagulation time of the blood was seven minutes), and there developed an acute post-operative suppression of urine. In those cases of gall-stone disease in which other pathological states were present, appropriate additional operations were performed. Erdmann, in his case, did a cholecystostomy and an appendectomy. Brothers, in one case, removed 205 gall-stones, exsected one inch of the left tube to induce sterility, and did a right salpingo-oophorectomy for an existing right tubal gestation.

There is a wide difference of opinion as to which operation, cholecystostomy or cholecystectomy, is indicated in gall-stone diseases. Some operators almost invariably perform a cholecystostomy; others equally competent believe that cholecystectomy is the most universally applicable operation for the cure of cholelithiasis. Others do as Kumnel, who says, "We remove the gall-bladder when we must, we save it when we can." It is well to select the operation which can be performed in the shortest possible time consistent with the existing conditions of the biliary passages. After cholecystectomy, re-drainage of the biliary passages may prove extremely difficult and dangerous. The advocates of cholecystectomy claim that the removal of the organ takes away the possibility of stones being left behind, being reformed, that it removes an inflamed organ.

It is agreed that cholecystectomy is attended with more technical difficulties than cholecystostomy. It requires greater care to avoid injury to the bowels, vessels and the main bile ducts. It is wiser to choose the safer operation until the technic of the more complicated one has been mastered.

Cholecystostomy is the operation of election:

1. Whenever the patient's condition is so bad that the difficulties attending a cholecystectomy render its performance unsafe;

2. When the gall-bladder is not seriously damaged and when the cystic duct is not ulcerated or narrowed by stricture. It is believed that the gall-bladder has some other function than that of a mere receptacle of bile.

3. When the common duct is strictured.

4. If jaundice and pancreatitis complicate the gall-stone disease.

Cholecystectomy is indicated:

1. For very thick, acutely inflamed, or gangrenous gall-bladders in which a stone is impacted in the cystic duct.

2. For chronically thickened gall-bladders. A thick walled gall-bladder which has become functionless should always be removed. When the gall-bladder becomes thickened and hardened from long continued inflammation, it is manifestly impossible that it should dilate no matter what obstruction there may be in the common duct.

3. For large gall-bladders distended with clear fluid and resulting from the impaction of a stone in the cystic duct.

4. For the "strawberry" gall-bladder (chronic thickening with ulceration).

5. For a calculus gall-bladder adherent to the stomach, intestine or omentum.

6. When the walls of the gall-bladder are so modified by disease that neither the storage nor the expulsion of bile is possible.

**Summary.**

1. Gall-stone disease occurs with far greater frequency in women than in men; with far greater frequency in women that have borne children than in women that have remained sterile. Its period of greatest incidence is the child-bearing period.

2. Gall-stone disease, alone or associated with one or more other related or non-related pathological states, not uncommonly complicates a pregnancy otherwise normal or abnormal.

3. The first manifestations of cholelithiasis may date from the existing gestation or from a previous pregnancy; may precede, coincide with or follow an abortion or premature labor, accidental or induced.

4. All conditions that are associated with, that favor or cause: a. bile stasis; b. inflammatory or degenerative changes involving the gall-bladder or bile tracts; c. pathological alterations in the composition of the bile, such as hypercholesterinaemia, etc., predispose to gall-stone disease.

5. Pregnancy is an important etiological factor in the causation of cholelithiasis.

6. The pathology of gall-stone disease complicating pregnancy is the pathology of gall-stone disease occurring in the non-pregnant. There may be present: a. an inflammation of the gall-bladder or bile ducts in which one, two or many calculi are lodged, or impacted; b. a distention of the gall-bladder or bile ducts by mucus, pus or calculi; c. a pericholecystic inflammation, calculous in origin, leading to adhesion formation, to fistula formation, etc., and corresponding disturbances of function; d. changes in the liver; e. changes in the pancreas.

7. Some of the symptoms of gall-stone disease are due to the irritation inherent to the presence of gall-stones, to their migration through, or impaction in the bile ducts or neck of the gall-bladder. Other symptoms are due to the concomitant inflammation of the gall-bladder, bile ducts and neighboring organs, causative of or resulting from the presence of calculi.

8. Rupture of a gall-bladder distended by calculi, fluid, mucous or purulent in nature, can occur during gestation or during or immediately after labor.

9. In the differential diagnosis of this condition one should bear in mind:

a. That not infrequently gall-stone disease originates during or may complicate pregnancy;

b. That cholelithiasis and cholecystitis owing to their reflex symptoms are often mistaken for gastric disease;

c. That appendicitis and gall-stone disease frequently co-exist;

d. That digestive disturbances associated with acute pain and tenderness in the right hypochondriac region, with or without jaundice, with or without symptoms of biliary colic are in themselves ample justification for operative exploration of the gall-bladder and ducts.

10. Cholelithiasis is a surgical disease; it calls for operative relief. Medical measures in this disease are merely palliative; appropriate surgical measures are curative.

11. Gall-stone disease in itself is never an indication for the artificial termination of pregnancy.

12. Whenever, for some cause or other, the abdomen is opened in women of the child-bearing age or past the child-bearing period, the gall-bladder and larger bile ducts should be examined if it can be done: a. without or with only slight traumatizing of the tissues; b. without exposing the patient to too much additional risk; c. without contaminating clean peritoneum. Should the patient give a history of chronic digestive disturbances, the indication is absolute.

13. Women exposed to pregnancy, suffering from calculous cholecystitis, or any other form of gall-stone disease, should be operated, the calculi removed, and the gall-bladder drained.

14. Pregnancy does not contra-indicate operations upon the gall-bladder or bile tracts. Peterson reported only three miscarriages in 23 reported operated cases. In only one (Roith) of the cases which we considered, did abortion follow the operation.

15. It has been repeatedly demonstrated that the operative relief and cure of cholelithiasis does not unfavorably influence gestation, does not unfavorably influence parturition. Icterus, whether acute or chronic, is a constant menace to the foetus.

16. Early operation is now, in proper hands, a safe procedure. It is an effectual cure of the symptoms produced by gall-stones; it has low mortality and guarantees against serious complications in the future.

17. Cholecystostomy, cholecystectomy, and choledochotomy have been successfully performed upon pregnant women for the relief of gall-stones. After these operations, drainage is to be employed until the bile ceases to flow spontaneously through the wound, until complete subsidence of whatever degree of cholangitis existed.

18. The prognosis of operative intervention is not unfavorably influenced by the existence of pregnancy.

19. In persistent gall-bladder disease, trouble changes in the urine manifested by the presence of casts and albumen are not uncommon and are not necessarily a bar to operative interference.

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An accessory pancreas may sometimes be a causative factor in the production of diverticulum of the intestine by exerting continuous traction on the intestinal wall during development. If the swelling protrudes into the lumen of the bowel and attains a considerable size, it might produce obstruction, or it might cause an intussusception.—(*Benjamin*).

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In uncomplicated shock transfusion theoretically should be of no value. However, such cases with a diastolic pressure below 50 may be greatly benefited. In shock associated with hemorrhage, if sudden, even though small, transfusion is of great value.—(*Kimpton.*)

## ESTHESIOMANIA.

### A Study of Some Queer Folk in New York's Latin Quarter.

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Esthesiomania is a form of insanity marked by perverted moral feeling and by purposeless eccentricities. (Gould.) Though quite prevalent little has been written about it, many textbooks omitting it altogether.

Almost every person has some peculiarity or trick of behavior or speech, some views, theories or ideals which are rejected by the great mass of thinking individuals. It is this peculiarity in behavior, speech or thought that stamps upon the person the special characteristics of his personality. The strong personality possesses some obvious peculiarity which distinguishes him from other persons; the weak personality has none. The peculiarity may exist in any of his mental faculties, reason, judgment or imagination, or it may be in the volitional or emotional sphere, or it may be some trick of behavior, inherent or acquired and retained through habit, or it may be some peculiarity in his appearance. This peculiarity in imagination makes the artist, the poet, the novelist, the composer. In reason it makes the thinker, the philosopher, the scientist. In the volitional sphere it makes the leader and master of men, the successful head of concerns and governments. Normal emotions of like nature differ so greatly in different individuals that peculiarities in the emotional sphere pass unnoticed unless they are greatly exaggerated, depressed or perverted and the associated agitation is unnatural. When this occurs the individual is said to suffer from emotional insanity. The peculiarities in behavior vary from the barely appreciable trick in action, dress or speech to the most pronounced deviation from the normal or conventional.

It is not possible to say just at what point the deviation from the normal becomes a manifestation of insanity, and it is not often possible to determine if it is due to an aberrant moral sense, a delusion, a purposeful object which has a rational basis, or it is merely the retention through choice of an obsolete custom. In a close study of a number of the erratic, unconventional class called bohemians, in the Latin quarter of New York City, I found many men and women presenting marked peculiarities and eccentricities, departures from the customs, styles or ethics of the day, yet they possessed an idealistic sense of morality. Others possessed an inherent sense of justice but they cannot adapt themselves to the restrictions upon behavior imposed by society. Some deliberately adopt eccentricities in a spirit of bravado, others in a spirit of egotistic to attract attention and secure notoriety, some for a commercial or mercenary purpose. It was possible in some cases to determine an aberrant, perverted moral feeling and trace from this the obvious eccentricities.

I have not however been able to satisfy myself that some of the so-called broad "minded views" held by bohemians of "the village," as this section of the city is called locally, are indications of perverted morals; or that their eccentricities and deviations from the conventional are always signs of mental or moral aberration. We must remember that what is considered moral in one place or at one time may be considered unmoral in another place or at another time, that the styles, customs and ethics of one community or in one strata of society will be looked upon as queer and abnormal in another community or in another stratum of society. Moreover our code of morals are often determined by temporary public policy, caprice or fashion, and the ever-changing legal statutes often make acts moral or unmoral without regard to the fundamental sense of justice. It is hardly necessary to dilate upon this factor in the determination of morality and immorality as a moment's reflection will make it clear. As for the eccentricities met with in the village, some will be found upon investigation to be perfectly rational modifications of customs which impose restraints or restrictions. Thus we look upon the wearing of sandals by some of the villagers as an eccentricity yet the sandal is a far more healthful footgear than the high-heeled, narrow-pointed shoe. The hair "bobbed" is more sanitary than the hair worn long and twisted on top of the head. Smocks, blouses, low, broad-toed shoes, dispensing with corsets, wearing overalls or Chinese garments, etc., are comfortable, sanitary and save time and labor. The men stick more closely to the conventional in dress, speech and behavior but are tolerant of the eccentricities of the women and do not object to appear in public with them however conspicuous their eccentricities may be.

I found the study of esthesiomania an interesting diversion from geriatrics but I found it necessary, in order to study it in its natural habitat, to live in the village as a village bohemian, as one of the class among whom it was most prevalent. One must live the life to understand it.

Many of the so-called bohemians are merely shamboes, sham bohemians, who imitate and exaggerate the eccentricities of well-known characters to attract attention to themselves. They are egotists, extravagant in their eccentricities, loud in talk, radical in their expressed views but shallow and weak when pinned down to discussion. They are readily swayed by argument or threat, are not inherently vicious or immoral, but, like the high-grade moron, they lack a sense of responsibility and obligation to society. They are studiously negligent in their appearance, talk art, music, literature apparently erudite to the uninformed but banal to the person familiar with the subject. They fit up their rooms in a bizarre fashion and make a display of them as they do of themselves to secure notoriety. Their whole life is a sham.

It is hardly necessary to speak of those who deliberately affect eccentricities in dress and surroundings for commercial purposes, to attract visitors to their shops. Most of them lead at home quiet, regular, conventional lives. Others affect eccentricities in dress and conduct in a spirit of bravado, women especially adopting them to show that they are "emancipated" and can do anything a man can do.

Greenwich village has received an unenviable reputation through its exploitation for commercial purposes, by a few tradespeople who play upon the morbid curiosity of sightseers. The bohemian community is not on exhibition, it does not lend itself for exhibition purposes and the real bohemians quickly desert resorts that encourage the patronage of slummers and sightseers. What these visitors really see are places especially fitted up to satisfy their curiosity, while the persons there, whom the slummers look upon as village freaks, are, almost all, sightseers like themselves. Some of the resorts frequented by the villagers are curiously fitted up and decorated and their owners present various peculiarities, but each has its own regular clientele, and they make no efforts to attract sightseers. In a tea-room which I visited frequently there is a motley collection of chairs, benches, round tables and long tables, candles and lamps furnish the illumination at night, the

walls are covered with crayon drawings and there is a general appearance of disorder, startling to the person who is accustomed to the order and neatness of the home or fashionable shop. But after the first shock, this very disorder arouses a sense of freedom in conduct or rather a sense of release from the restraints of conventional society and one becomes quickly imbued with a feeling of complete relaxation. The owner, who is a tactful, charming hostess, is also a keen judge of human nature, and by her ingenuous unconventionality she arouses the admiration of the most straightlaced women and the interest of men generally. Her particular abominations are the freaks, slummers and "spooners." Being the wife of an artist many artists visit her place but her patrons by day are mostly young women who come there for a cup of coffee, a smoke and a chat. In the evening there are, at present, many soldiers and sailors, including many officers, but most of the regular frequenters are men who come here for relaxation from serious work, and who prefer to drink coffee and smoke in the company of congenial persons of both sexes than to spend the evenings in the saloon or club.

In another tearoom there is a similar incongruity in decoration and furnishings, the place is dark and there is a darker, low-ceilinged back room, with a couple of benches and tables. Many of the regular patrons belong to the freak class and the sightseer is usually repelled by the aspect of the place as soon as he opens the door. In another popular village resort there are long tables and benches, low benches and small children's chairs. There are numerous ornaments painted in bizarre styles on the mantle and a few paintings on the walls. This place attracts mainly writers, political radicals and some musicians. It is one of the few, street-level resorts which does not make efforts to attract sightseers. There are two large hotel restaurants and cafes which the villagers patronize when they have the means and which sightseers occasionally visit; but the most popular restaurant, an Italian place frequented by the poorer and the more eccentric of the village bohemians, is rarely visited by strangers.

The bohemians of the village form a close community, but there are many residents and frequenters who have bohemian tendencies yet live fairly regular lives. Many men and women, eminent in their vocations, frequent or maintain rooms in the village, for the indulgence of petty vices or to secure complete relaxation from their serious work, and to feel a sense of freedom from the restrictions of conventional social life. Especially noticeable among women is the large number of nurses and social workers. It may be that the occasional desire for this sort of diversion is the reaction following the prolonged forced restrictions imposed by society. Having become accustomed to these restrictions from childhood we do not recognize them as restrictions, yet there is occasionally a revulsion of feeling, a desire for the elemental freedom from all restraint and this desire is gratified by leading an unconventional life, if only for a few hours. Those who follow these temporary impulses are not real bohemians. The class I wish to describe in this paper are inherently erratic and unconventional and their eccentricities are permanent characteristics.

The true bohemians do not advertise the fact that they are bohemians, nor do they deliberately violate the dictates of society. They ignore them as though unconscious of any social restrictions. They do not pose nor do they affect eccentricities to attract attention to themselves, neither will they lay aside their peculiarities if these peculiarities make them conspicuous. Their temperament, vocations and irregular habits are closely interrelated. Temperamentally emotional and imaginative they seek vocations where these qualities can be brought into play and they become artists, writers, musicians, actors or they are engaged in other work which does not demand concentration of the reasoning faculty. Their vocations are such that they are seldom bound by fixed hours, or to a fixed locality, or have a fixed, steady income.

They are therefore irregular in their habits and they can adapt themselves readily to changed circumstances. They lack ambition and if they seek fame at all, it is only as an aid in securing a livelihood or for a momentary gratification. They are usually improvident, unpractical, indolent and lack the sense of responsibility and obligation. Wanderlust, procrastination and a lack of neatness and order are common failings and the pursuit of pleasure is a more important factor in their lives than their future welfare. While most of the men belong to the intellectual class and many are college graduates, and many of the women are college or convent bred, the belief in palmistry, phrenology, clairvoyance, astrology, fortune telling by cards and other methods, is very prevalent and they readily adopt peculiar cults and fads especially such as have something of the mystic or mysterious about them.

The lack of the sense of responsibility and obligation extends to their social relations. There is a spirit of good fellowship not found in conventional society and entirely different from the spirit of friendship. At social gatherings there is no thought of sex differences, women smoking, drinking and often paying their own bills, taking part in discussions and unabashed if the conversation takes a turn which would exclude them in conventional gatherings. There is no deep or lasting affection in this good fellowship and the "hail fellow, well met" feeling disappears at the parting. There are seldom deep, lasting friendships except in the "pal" relations between couples of opposite sex. In some of these cases there is true platonic love, couples sometimes living together as though they were of the same sex. In other cases marital relations are maintained without civil or religious bonds, in some the relations are frankly those of man and mistress, and sometimes couples live together as pals and occasional sex mates but each retains absolute independence. I have reason to believe that in some of the "pal" relations, between individuals of the same sex as well as between individuals of opposite sex, the couples are perverts.

There are many married couples but few children, the women apparently lacking the maternal and domestic instincts of their sex. The wives usually retain a certain degree of independence, choose their own friends, follow their own inclinations, work when they are in the mood, and being generally able to earn their own livelihood they leave their husbands, temporarily or permanently, at will. Lacking domesticity there is rarely a well-regulated home life. I have visited a number of homes in the village and, except where there were children, the couple had only one or two rooms, the one room serving as workshop or studio, kitchen, dining-room and often as sleeping room. In some homes the couch which took the place of the bed was in a small adjoining room. Some did a little home cooking but most resort to tea rooms and restaurants for their meals. Being improvident as a rule, when they are supplied with funds they eat at expensive restaurants without the slightest thought about the fu-

ture. The next day they may be without means and they will starve or trust to their borrowing abilities to supply themselves with funds, or depend upon the generosity of a friend for a meal or two. Money thus loaned is rarely repaid but if treated to a meal they will usually select the cheaper dishes on the bill of fare. There are however many mercenary men and women in the village; men who will depend upon their friends for support or who will allow themselves to be supported by women, and women who depend almost entirely upon their persuasive powers for their livelihood. These women will beg or borrow as much as they can get from their friends, through pitiful tales, without the slightest intention to return the gift or loan or give anything for it.

The doctrine of free love, not promiscuous sex relations but the unrestricted selection of sex mates, is upheld by many of the villagers. I was surprised to find that the strongest supporters of this doctrine were virtuous, unmarried women who had set ideals for their husbands or mates that were unattainable. In their love affairs, men and women, married and unmarried, are fickle, their emotions being intense but rarely deep or lasting. Couples become friends, pals and mates without the slightest thought of marriage, sometimes living together without sexual relations, separating upon slight provocation, and often without severing friendly relations. Sometimes couples marry with the sincere purpose to establish a family, but in some cases couples marry after a short acquaintance, to give their sexual relations an air of respectability and they separate when they tire of each other.

Marital infidelity is not judged as harshly as in conventional society nor is sexual fidelity looked upon as the vital bond in their union unless that union is based upon this factor, and infidelity is often condoned. As the women almost without exception can earn their own livelihood separation or divorce is not considered a great hardship, nor does it influence in the slightest degree their status in this stratum of society.

I met several individuals who maintained the closest social relations with two or three mates, an intellectual mate, a spiritual or soul mate and a physical or sex mate, each filling the one role alone in relation to that individual. So complete is the separation of these elements which are normally combined in the love of one's husband or wife, that when the individual marries one of these mates there is lacking the sense of proprietorship which husband and wife usually possess in each other. If intellectual affinity is the basis of such union they allow each other perfect freedom in the other directions and the same holds good if the union is based upon spiritual or physical affinity. The attempt on the part of the husband or wife to monopolize the mate's interest in the other direction is the usual cause for separation, and in most cases the prolonged close association with an intellectual or spiritual mate will arouse sex attraction and give rise to cause for divorce.

I found in the village a number of sex perverts, male and female, including saddists and masochists, and a few inverts, masculine women with female perverts as mates and effeminate men with male perverts as mates.

The laxness of morals is in some inherent, in many it is a gradual development from some petty peccadillo, as the smoking of a cigarette in a spirit of bravado. The sophistical argument that it takes a strong will to adhere to the conventions of society and a stronger will to break away from them, is alluring to the headstrong man and woman, and the free lance life is attractive to persons who chafe under social restraints and crave the sense of elemental freedom. Some jump in, throwing off all restraint at once, others go gradually throwing off one restraint after another until they have become thoroughly imbued with the bohemian spirit, with its carelessness, flippancy, lack of the sense of responsibility and obligations, and loose and aberrant morals. There are however many who despite their irregular, erratic and free lance habits and their broad-minded views, retain their inherent sense of justice, right and propriety, and to whom the coarse sex relations are repugnant and revolting. There are some villagers who are accustomed to the dress suit and decolette and are welcomed in fashionable circles.

The grosser and more obvious of the eccentricities in dress, behavior, environment and speech are in most cases gradually acquired and unconsciously developed. Beginning with the general custom in the village of using candles instead of gas or electric light, wood fires instead of stove or radiator heat, and couches instead of bedsteads, they next proceed to furnish and decorate their rooms in a bizarre fashion. The shambo has no system in his style of decoration but imitates and exaggerates the style of someone whose example he follows. The artist, musician and writer generally decorate their rooms in a style which proclaim their vocation. Others have some hobby which they exhibit in their decorations, and in some cases the decorations and furnishings are so grotesque and incongruous as to leave no doubt about the state of the individual's mental condition. In a two-room apartment a woman living alone has a large couch in the smaller room completely filling this room, and two couches, two tables, two writing desks, one chair and several footstools in the larger room. Part of the walls are artistically decorated with pictures and figures, while on another part of the wall the wallpaper hangs in shreds.

A man occupying a two-room apartment uses the larger room as his bedroom, the bed occupying the middle of the floor, and so placed that it must be shoved aside whenever the door is opened. In the smaller room are tables, chairs, trunks, cooking utensils, etc., all strewn and scattered about.

A man living alone in a small room has this room so filled with furniture that one is barely able to squeeze into the room and it is necessary to shove the furniture around to go from one side of the room to the other. Most of the furniture is unnecessary. One woman has a different colored curtain in each window, another will have nothing but her couch in a large, light bedroom, while the dressing table, bureau, chairs, rug and washstand, which are usually placed in the bedroom, are kept in the room which serves as a kitchen and dining-room. In some apartments there is a most incongruous collection of furniture, in some the furniture is painted in startling and inharmonious colors, without any regard for color scheme or sense of beauty. Lack of neatness, order and cleanliness are frequently found but these can be ascribed usually to laziness.

Eccentricities in dress are as marked as eccentricities in interior decorations, but they are not often on public view. One man who has long grey hair, the locks falling over his shoulders, wears a wide-brimmed, high-peaked hat and a rather long coat. These, with his thin, austere face, gives him the appearance of a puritan and his views of life and mode of life correspond with his appearance. Though engaged in clerical work this man is an artist, his room being filled with paintings and other works of art upon which he had spent years of labor. He will not exhibit them or dispose of them,

as he says he did this work for his own pleasure and he does not seek notoriety. Here is a case where an exaggerated moral sense is associated with the characteristics of the day when his ideas of morality were normal.

A convent-bred girl has carried her hobby for oriental things to such an extent that she wears a Chinese costume in her home, pencils her eyebrows in such a fashion as to give her eyes an apparent slant, has Chinese decorations in her room, burns Chinese incense and studies Buddhism. Another woman wears a riding habit in her apartment, though she never rode a horse. One woman who claims to be of royal descent has a penchant for purple, has purple furnishings in her home and always wears something purple, even when going to bed. One of the famous village characters never wears a hat, apparently never combs his hair and generally wears an old brown corduroy coat. An elderly man who frequently comes to the village is likewise always bareheaded, wears a light palm beach suit winter and summer, low shoes and no socks.

There are many little eccentricities in action and behavior which while harmless are so noticeable as to attract instant attention.

One woman will not keep in step with a man with whom she is walking and when she finds that her companion is making efforts to keep in step with her she will deliberately get out of step. She says she is afraid that unison in action with a man might detract from her individuality. I have met several men and women who will not shake hands, some who will not return a greeting or bid good-bye. One man will not pass a church if he can avoid it and will cross the street if he must pass one. So firmly is this impressed upon his mind that on one occasion while I was walking with him and kept him engaged in conversation he crossed the street when reaching a church and recrossed it when we passed the building yet was apparently unconscious that he had done so until I called his attention to it. He can give no reason for this peculiarity. One woman will not be on friendly terms with a left-handed man but she gives as a reason for this peculiarity a fortune teller's warning that she would marry a left-handed man and she would live unhappily with him. A university graduate believes it is unlucky to touch copper and he will not touch anything containing copper.

It is possible to explain some of these eccentricities by habit, the retention of customs which have become obsolete, possibly by the development of ancestral habits or traits. Some of the apparently purposeless eccentricities may be in the nature of sex lures (which are after all merely manifestations of the instinct for race preservation), since their possessors attract persons of the opposite sex having similar peculiarities. I found several such close social relations between mental freaks of the village.

For the purpose of obtaining access to this class and getting material for this paper I took as a roommate a man who had been twice in asylums on account of his eccentricities. He graduated from one of the large eastern universities and studied for the ministry but was totally unfitted for this vocation and became a ranchman. He lost his ranch through mismanagement. When I met him he was working in a government plant, doing night work as he preferred to sleep by day, and earning four dollars a day, a boy's pay in that shop. His pay was dissipated in foolish purchases and loss of time. On one occasion he spent two dollars to save fifty cents on a purchase, wasted the greater part of the day and was unfit for work the following night. While with me he saved the wax from the molten candles, remolded them, pulling out strands of wool from a good shirt to make wicks. He thereby destroyed the shirt and then used it for a mop. He put his laundry in a bucket to wash it, went downstairs to buy laundry soap and came back a few days later with a cake of fine toilet soap, having in the meantime forgotten about his laundry. This man had no delusions but he lacked judgment, had a poor memory and had no special sex regard for women, treating them as though they were men. Among his friends was a woman who had just been discharged from an insane asylum and who became my neighbor. They spoke of each other in the most extravagant terms, each believing the other was the most wonderful person in the world. Another friend to whom he introduced me was a middle-aged unmarried woman who had founded a peculiar religious cult; another was an elderly widow, who comported herself like a giddy girl, painted and powdered, dressed in youthful fashion and practiced the arts that a certain class of young women practice successfully to attract desirable male companions; another, an artist of some fad school, was apparently a drug habituee, and one was a woman known in literary circles who presented a number of petty eccentricities. Of the two male acquaintances that he introduced me to, one was a pervert, the other was so reticent that I could not get an opinion or expression from him beyond the customary greeting and routine talk about the weather. Every one of these eight persons was a college graduate and each one had some mental abnormality which betrayed itself in some eccentricity.

Before closing this paper I will mention briefly some of the extraordinary views expressed to me by villagers. Several men and women, married and unmarried, have expressed the view that "couples should have sexual congress before marriage. This would eliminate this factor as the man's primary object in matrimony and satisfy the woman's curiosity." One woman believes that "couples should live together for three months without sexual relations to determine their compatability. If satisfactory, they should live together in complete marital relations for three months more and then decide if the union is to be permanent or not." A married couple say "couples should marry with the understanding that the husband should be the father of the wife's children, but each may have other sex mates." A sadist: "The more you hurt them the closer they cling." He gave a visible demonstration of this; the woman having been spanked came back for more punishment. The view that "prostitution is a perfectly legitimate means of earning a livelihood" is held by many persons in the village even by some virtuous married women. A married man says "we are all bargain hunters, but most men buy white elephants." In a discussion between a well-known socialist and a village bohemian the latter said: "You are a political radical and try to impose your views upon others. We are social radicals but do not try to make converts. We are satisfied to let everyone live his own life as he may."

In this paper I have dwelt more particularly with persons who live in the poorer sections of the village and frequent the poorer resorts. The habitues are, however, not all poor and it is not unusual to find men and women who are fairly well to do in some of the poorest and queerest resorts, and persons who one day are obliged to dine in the cheapest restaurants, dine the next day in some of the more expensive ones. As I said before the bohemians of the Latin quarter of New York City are an improvident lot and live according to

their means at the moment, without a thought of the morrow. They are not all queer, eccentric individuals of loose morals, despite this popular impression of the people of this quarter, which has been deliberately fostered by mercenary shopkeepers to arouse morbid curiosity and attract sightseers as patrons. The so-called bohemians one sees in these shops are either shamboes or attendants who are used as advertisements like the "ballyhoos" in the Coney Island resorts. The bohemians form a close community, though access is not difficult, but there are also in the village a number of close communities or circles of queer folks to which only their own classes are admitted. Queer fads and cults occasionally sweep through the village like an epidemic and give rise to eccentricities which are sometimes retained long after the fad or cult has disappeared. Occasionally a fad or cult is maintained by a small circle. Some like the erotic dance fad, the free love cult, the psychoanalysis craze, the hasheesh eating fad, were centainly the outcome of a perverted moral sense and the eccentricities arising therefrom fall within the meaning of esthesiomania. But since the inherent moral sense is modified by the ever-changing dictates of local society and local statutes, it is not possible to fix a standard of morals applicable to all places, times and classes, and it is rarely possible to say with certainty that apparently purposeless eccentricities arising from a deviation of the dictates of society or the statute law is a form of insanity.

103 West 88th Street.

## NEW CHARACTERS AND DEVELOPED CHARACTERS.

CASPER L. REDFIELD,
Chicago.

Physicians and surgeons have learned many things by experiments on lower animals, and they are likely to learn a good many more in the future. But not all the things to be learned from the lower animals come directly in the domain of surgery or medicine. There is something in the way of vitality which enables the infant to survive infancy, to fight off or resist disease, and to live to a good old age. There is also something in the way of producing men and women who will be more than feeble minded, and the entire medical pro-

I have found that by going to the horse, the dog, the cow, and some other animals, I can get exact records relating to the development and degeneration of animal powers, and that I can link these with similar but less complete records in the case of man. It is because I can get such records and can apply them to human welfare that I go off into horse racing, horse breeding, and various other things which seem to have more of a flavor of sports than science. Bear with me for a time and it will be seen that I am bringing to the front scientific facts which not only have a profound bearing on human welfare in general, but have a direct application to the medical profession as such. I cannot tell all of my story at once. It must come piecemeal.

A textbook on the principles of breeding has the following:

"The appearance of a positively new character in any of these races would be cause for profound astonishment. Under the present state of knowledge, and for our purposes, we may say that there are no such things as acquired characters, in any proper sense of the term. It is a figure of speech at best, and a most unfortunate one at that."—Davenport: Principles of Breeding. p. 359.

High speed at the trot is a new characteristic in horses, and one which never existed in any breed of horses until forced there by the art of man during the nineteenth century. In horses, the natural high-speed gait is the running gait and, until very recently, any horse pushed for speed would invariably break into a run. Now we have "natural born trotters" which will stick to the trot, no matter how hard they are forced.

This new characteristic did not arise as a variation or mutation, in the ordinary or proper meaning of those terms, and selection had nothing to do with its origin or development. It is strictly an acquirement which has become inherited, and we may trace that acquirement and inheritance, step by step, back through a century of time. I have published in journals devoted to horse breeding the details of that process of acquirement, and have summarized the evidence in *Dynamic Evolution*.* There is room here for only a general statement of the process. In passing it may be remarked that the statements here made are based on an investigation of the thing itself, and are not deductions based on other and unrelated matters.

High speed at the trot demands greater power than high speed at the run. Hence, the first thing necessary in getting high-speed trotters is to get into the animals a power which they did not have before. That thing was done, but it was not done by professional horse breeders, or by any persons who had anything more than an incidental connection with breeding. It was done by farmers, by sports, by gamblers and by reckless individuals who made nuisances of themselves in their communities. The first information that the professional breeders had of this matter was the discovery of remarkable trotting powers in the progeny of Hambletonian 10.

Hambletonian was a coarse horse of poor conformation and his progenitors for several generations were the cheapest kind of cheap stock. But we can trace, through a period of sixty-nine years, and the lives of twelve separate and distinct animals, the exact process by which his special qualities were produced. That process consisted in forcing each one of those twelve animals to do an extraordinary amount of work before reproducing. This work was principally trotting work, mixed with a small amount of running work. But whether trotting work or running work, that work developed and hardened the muscles of those horses so that each one of the twelve had acquired much physical strength by its own work before reproducing. That work was hard work all of the time, and summing up the total amount of time put in by those twelve animals we find that it aggregates one hundred and five years more than is normal or average in ordinary horse breeding operations. Note that accumulated one hundred and five extra years of hard work.

Hambletonian is called the founder of the trotting stock because he was the principal source from which breeders obtained their supply of improved animals, but he is not the only source. A second source was in Mambrino Chief, and minor sources may be found in Justin Morgan and several others. When we examine the pedigrees of these other horses we find that they originated from cheap stock by extra work continued for several generations, but which work before reproducing was not so extreme as in the case of Hambletonian.

Following Hambletonian there has been much further improvement in trotters, but none of that improvement came through any son or daughter of Hambletonian which was selected by breeders for breeding purposes

* Published by G. P. Putnam's Sons, New York.

when those sons and daughters were young or in an undeveloped condition. It came through those sons and daughters which were first discarded by breeders as unfit for breeding purposes, and which consequently had to work hard for their oats first and were bred afterwards. The greatest of the improvement came through those particular sons and daughters which were worked hardest and longest before being bred, and it came to a less extent through those which were not worked quite so hard or quite so long. But the improvement in trotting power never came unless the animals of each successive generation were worked more than the normal amount before being bred.

The hard work from generation to generation was the origin of the power to trot. Causing the horse to stick to the trot at high speed was the product of education continued from generation to generation. The horses of each generation were *taught* to trot to their utmost ability and not break into a run. They were driven hard, and whenever one would break into a run under pressure, he was instantly stopped and started over again. As a result of that education continued from generation to generation we now have trotters which do not need to be educated on that point. They are born with the disposition to stick to the trot under all circumstances, and that disposition exists only in the descendants of those which were extensively educated on that point. That education is a mental one just as well as it is a physical one. It is a case of a new "instinct" being implanted in an animal by intensive education extending over from five to ten generations.

The reader should not get the idea that the thing learned is the thing inherited. In exercising any organ, that organ gains in strength as a direct result of that exercise. If a man swings dumb bells he gains strength in the muscles of his arms because it is those muscles which are exercised. By continually doing a thing over and over it becomes easier and easier to do that thing because the muscles employed become more and more powerful. It is that acquired power which is the thing inherited by the next generation.

Seventy years ago and less, when a horse was forced to high speed at the trot, the extra strain on the trotting muscles caused a distress which the horse would try to relieve by breaking into a run—his natural high-speed gait. But by continually exercising the horse at the trot his trotting muscles gained in power generation by generation. At the same time, the horse not being exercised at the run, his running muscles deteriorated in power generation by generation. The ascending and the descending lines have now crossed each other, and our "natural born trotters" are animals in which the relative development of muscles is such that it is easier to trot than to run.

What is true of these qualities in the horse is true of mental power and mental characteristics of man. Human intelligence has been increasing in the past, and is increasing now. We of today are mentally superior to our ancestors of a thousand years ago. One evidence of that superiority may be seen in the fact that we make inventions, whereas our ancestors of a thousand years ago did not make inventions. An invention is not the product of accumulated knowledge of the past. Anything which is such a product lacks those particular qualities which make it an invention. To be an invention, an improvement must arise above all past knowledge, and all ordinary deductions from all past knowledge. Unless it does these things it is not an invention.

Real inventions are not restricted to those things recognized by our patent laws. They extend to things in literature, art, science, business, and the general affairs of life. When a man by pioneering thought produces something distinctively new and radically different from what would be produced by another man highly educated in the line to which the new thing pertains, then that man has made an invention, no matter what that thing may be. In this broad sense, the people of the United States are producing hundreds of inventions every day. A thousand years ago the entire world did not produce as many inventions in a century as we now produce in the United States alone in one day.

There have been hundreds of famous trotters and famous progenitors of trotters. From records we can write out detailed pedigrees of each of these famous animals, and from records we can get the detailed histories of the parents, the grandparents and the great-grandparents, and earlier ancestors. From these things we can determine exactly what conditions produced each animal, and a determination so made is vastly more reliable than the dictum of some man who never investigated the matter. Those records tell a very definite and precise story, and that story is a story of work. Improvement comes through work in previous generations, and it comes in no other way. The assumption that these remarkable animals were mutations represents a false theory based on ignorance.

We have had in this world many eminent men. Some of them were simply men of learning, but more were pioneers in human thought. As such pioneers they were inventors who made inventions in art, science, literature, etc., as well as in mechanics. They were men of unusual ability, and while they all had pedigrees, we cannot trace the pedigrees of eminent men to the same extent that we can horse pedigrees. Still in hundreds of cases we can get definite and precise information about parents and grandparents, and sometimes about great-grandparents.

The information obtained in human pedigrees corresponds exactly to what is found in horse pedigrees. The eminent men of the world were products coming from successive generations of educated and mentally well developed ancestors. They did not come from ancestors who were young when they reproduced in the line leading to the eminent men. Neither were they from ancestors who were mentally undeveloped by reason of mental inactivity.

Are there no exceptions? It is a wise man who knows his own father, and in hundreds of cases investigated it looks as if there were two men who did not know their fathers. One of these was an acknowledged illegitimate. The other stands apparently as a solitary contrary case. But to believe that the man knew his own father is to believe that nature will sometimes violate laws which are never found to be violated in cases in which the records are above suspicion.

No, there are no exceptions. The human race is improved from generation to generation by increasing the mental and physical powers of the individuals who compose the race. I have stated, as the result of a direct investigation of the thing itself, that increase in inherited powers comes from causing parents to develop those powers by exercise before reproducing and comes in no other way. I have published the results of investigations into thousands of cases, and have challenged anyone to produce a single contrary case at all comparable in completeness of analysis to that which I have given to hundreds of positive cases. That challenge was backed by $1,000 deposited with

the American Genetic Association, the money to be paid out when that one contrary case was shown. The association kept the money for more than a year and a half, and then returned it. Improvement in mental and physical power comes by inheritance of acquirements made by parents before reproducing, and comes in no other way. No one could find an improvement coming in any other way.

In this connection it is proper to call attention to what an "acquired" character is as distinguished from a "thrust" character. When Weismann cut off the tails of mice he exercised certain muscles of his hands and arms, and that exercise developed those muscles. That development was an acquirement. Taillessness was something thrust upon the mice and not acquired. Acquired characters are inherited; thrust characters are not. The biologists have been investigating thrust characters and calling them acquired characters. Nowhere in their literature is there an example of a biologist investigating the inheritance of acquirements, or making any effort to do so. They have no information on the subject other than what I have furnished them.

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## HYDRONEPHROSIS.*

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Brooklyn.

I am presenting today the case of a young woman, 22 years of age, who has been treated in the medical clinic for symptoms due to an enlargement of the thyroid gland. She complains of nervousness, weakness, palpitation of the heart, and exophthalmia is quite marked. Under the care of Prof. Warren these symptoms have now improved and she was referred to the genito-urinary department because of an entirely different train of symptoms.

She states that these symptoms began at the age of 15, at which time she experienced sharp pain in the right lumbar region which would "double her up" and make it necessary for her to sit down to rest. Associated with this pain is a coldness of the entire body and a feeling of nausea. The pain has recurred at no stated periods and is unassociated with the taking of food, of fedication or season. The attacks of pain are of greater intensity when they occur about the time of the menstrual period. At present the pain radiates to the right iliac region. There is no dysuria, hematuria or polyuria associated with the condition.

Palpation of the abdomen shows a large, smooth, tender mass occupying the right iliac hypochondrium, moving with respiration and filling out the flank. It is apparently not attached to the liver. The left flank is normal.

Urinary examination shows a faint trace of albumin, oxalate crystals, numerous red blood cells and a few white blood cells.

The conditions to be thought of in this patient are a cystic ovary or a tumor of the kidney. The attacks of sharp pain in the flank would point to a renal calculus or to the condition known as Dietl's crisis. Dietl's crisis may be defined as sudden, severe attacks of pain in the abdomen, in the region of the kidney, chills, fever, nausea, vomiting and general collapse. It is thought to be due to a partial turning of the kidney upon its pedicle, with an obstruction to the outflow of urine through the ureter and a distention of the pelvis of the kidney.

To make a diagnosis of the condition it was necessary to have recourse to the diagnostic aids which we commonly employ in kidney cases. Cystoscopy was done. The bladder capacity was found to be normal and the mucous membrane healthy. Both ureteral orifices were small and not involved. The catheters were passed to the pelvis of the kidney on both sides without difficulty. From the right side a steady flow of urine took place, and six ounces drained away in fifteen minutes. The urine from the left side came in intermittent drops, showing a normal quantity. This test showed that the patient had an enlargement of the kidney, due to retention of urine in its pelvis, on the right side, and that furthermore, the secreting capacity of the kidney was but little impaired, since eight grains of urea to the ounce were found on testing.

To elucidate the condition still further, a pyelogram was made. The ureteral catheter was again introduced and sixty c.c. of thorium nitrate were allowed to flow into the pelvis of the kidney. A radiogram was then taken, and the shadow showed a greatly distended pelvis of the kidney, with the kidney displaced downward almost to the brim of the pelvis. No stone was shown in the radiograph, so that calculus was excluded, and the diagnosis of hydronephrosis with prolapsed kidney was thus clearly established. As the patient was suffering intensely from the periodical attacks of pain, operation was strongly indicated.

### Operation.

An incision is made in the usual manner over the right flank. The kidney is not felt in the usual position under the ribs, but is displaced downward almost to the brim of the pelvis. On freeing the kidney from the fat, it is found to be enlarged and adherent to the peritoneum, and with the pelvis enormously distended. The ureteral veins were two in number, very large and flattened against the outer portion of the kidney. The adhesions are freed from the kidney and its pelvis. The veins and artery are ligated separately. The ureter is tied and cut through and the wound closed in the usual manner.

On handling the kidney we find that the ureter is patulous, for a stream of urine issues from it. On cutting the kidney open we find that its calices are enormously distended by the accumulation of urine. There is a good deal of secreting substance which is unimpaired and the pelvis of the kidney is enormously distended, containing about six ounces of clear urine.

The causes of hydronephrosis in general may be briefly considered. Anything which interferes with the flow of urine intermittently will cause an accumulation of urine with distention of the pelvis of the kidney and calices and ultimately cause atrophy and thinning of the cortical substance of the kidney.

Infection with pyogenic organisms invariably takes place sooner or later, and the clear urine becomes turbid from pus.

The patience suffers from septic fever, emaciation, and not infrequently a perinephritic abscess develops as a complication. In other cases renal calculus forms as a secondary consequence to the retention of urine, and the case becomes complicated by symptoms of stone.

It is an interesting clinical fact that when the ureter is entirely occluded as, for instance, where it has been accidentally ligated in doing a hysterectomy, a true hydronephrosis does not take place, but the urinary secretion is retained in the pelvis of the kidney, and in

*A clinical lecture delivered at the Long Island College Hospital, Brooklyn.

Hydronephrotic kidney. Exterior view showing dilated pelvis.

the course of a few weeks its pressure causes an atrophy of the entire secreting substance of the kidney, so that it becomes entirely useless as a secreting organ.

In order to cause a hydronephrosis it is said that the obstruction must be intermittent, permitting an entire or partial emptying of the pelvis of the kidney and then allowing it to fill up again.

The various causes which may bring about a hydronephrosis are changes in the walls of the ureter, such by calculi, tumors, foreign bodies or clot, or pressure

Hydronephrotic kidney laid open and showing dilated pelvis and Calyces.

as valves, folds or strictures, or obstruction of its lumen from without by tumors or fibrous bands. All these will produce this condition. The most usual cause, however, is that of undue mobility of the kidney (floating kidney). Displacement or dropping down of the kidney may cause a kinking of the ureter, or a twisting of the ureter on itself. These conditions will temporarily shut off the flow of urine through the channel, but they are only temporary in character, recurring, however, from time to time on slight provocation and giving rise to the symptoms which have been described as Dietl's crisis. It is for this reason that a patient with a movable kidney should always be under observation lest a hydronephrosis develop as a result of the bending of the ureter. Apart from this condition, movable kidney may be carried indefinitely without doing any particular damage to the patient as long as the flow of urine is free.

A calculus lodged in the ureter requires surgical intervention at once on account of the pain which it causes, unfitting the patient for any activity in life, and also for the reason that hydronephrosis or pyonephronis will surely develop if the calculus is left alone.

As to the treatment of hydronephrosis in general. Various operations have been suggested for its relief. If the condition is caused by a movable kidney which can be brought into place and anchored under the ribs, extirpation of the kidney is not called for, and the condition can be relieved by a simple nephropexy, or fixation of the kidney. Unfortunately, however, when hydronephrosis has really developed, the kidney has become so firmly adherent in its faulty position that nephropexy is no longer possible. Various attempt have been made to resect a portion of the renal pelvis, but they have not been found to be satisfactory. A nephrotomy, or small opening into the pelvis of the kidney, with drainage of the urine through the loin, is surgically perfectly feasible, but the patient is subjected to the inconvenience of the passage of the urine through the fistulous opening in the back and is in a most distressing condition—wet and sloppy and stinking all the time.

It is a common experience in surgery that a patient can live with one kidney apparently as well as with two, and it seems to me, therefore, that the wisest procedure for the patient's comfort in the future, provided we know the other kidney is perfectly healthy and capable of supporting life, is to remove the hydronephrotic kidney entirely and let the patient go on with the single remaining kidney which we know to be perfectly competent to carry on the functions formerly performed by both organs.

32 Schermerhorn Street.

## Günzburg's Test.

A very useful office test in cases of hyperchlorhydria or acid indigestion is Günzburg's.

For the detection of free hydrochloric acid in gastric juice take 2 parts of phloroglucin, 1 part of vanillin, and 30 parts of absolute alcohol. If a few drops are heated with an equal quantity of gastric juice in a porcelain dish a carmine red color will indicate the presence of free hypdrochloric acid.

Deformities such as ingrowing toe-nails, clubbed toes, overriding toes, hallux rigidus are the result of the pressure of wedged-toed shoes, and to the pressure of short shoes. Mild deformities are corrected by plenty of toe room in the shoe. Attention must be given to exercise of the intrinsic muscles. Bunions, hallux valgus and inflamed great toe-joints are treated by making the shoe snug posterior to the ball, with a straight inner vamp. The sole may be elevated one-eighth to one-fourth of an inch on the inner side to relieve pressure on the great toe-joint.—(*Ashley*).

## A STABLE VITAMIN PRODUCT.

H. E. DUBIN, PH.D.

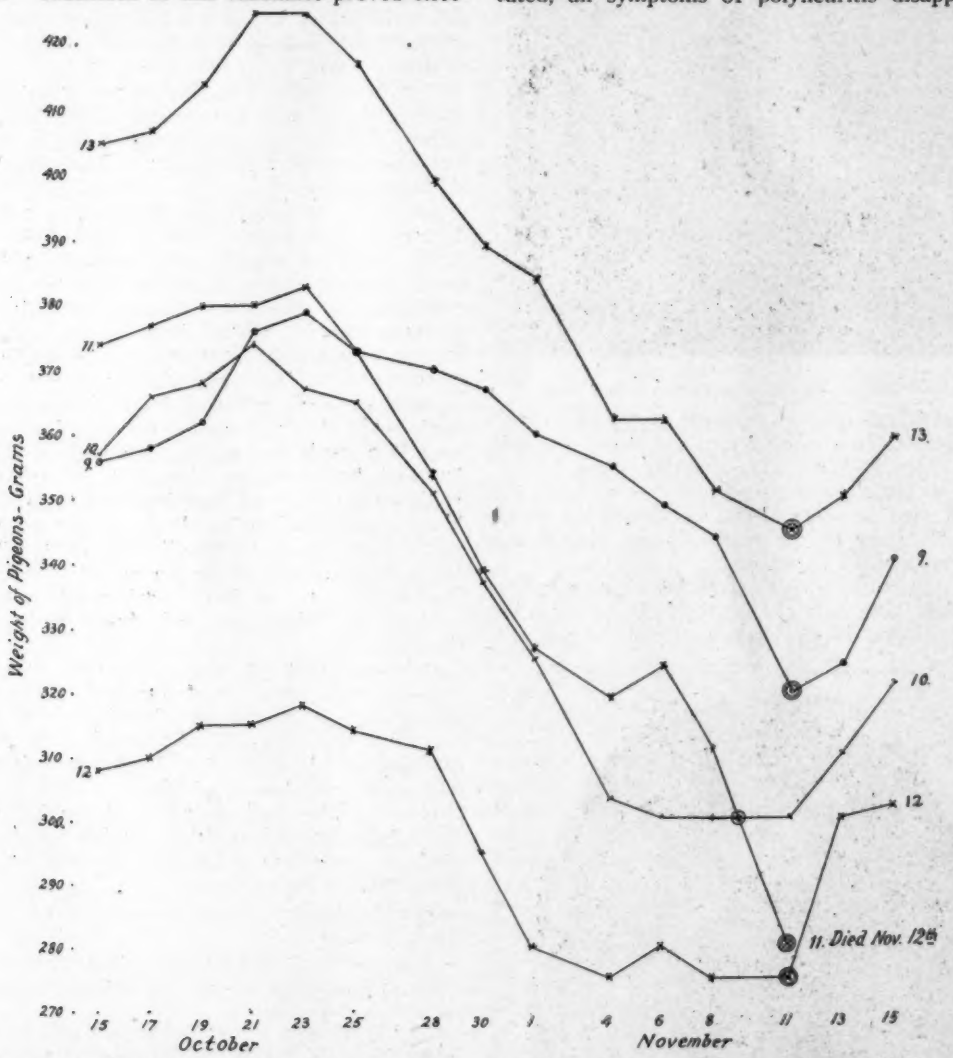
New York.

The theory that a diet of purified proteins, fats, carbohydrates and mineral salts, in proper proportions, was all-sufficient for the dietary wants of the body, appears to be no longer tenable. Experiments made by McCollum, Osborne, Mendel, Casimir Funk, Voegtlin, Myers and Lake, Simmonds and Pitz, Williams, Seidell and others prove that in such a diet, as outlined above, some element of prime importance for maintenance and growth is lacking.

In 1911 Funk isolated a substance which he termed "Vitamine." Inasmuch as this substance proved effective therapeutically in increasing body growth wherever the nutritive powers of the individual were below par. It was with this idea in mind that the present work was undertaken and we feel that we have developed a product that meets the above requirements.

Extended investigation resulted in the preparation of a number of vitamine products. A, D. K, KV and Z. The accompanying table and charts show that all of these preparations were capable of preventing and curing polyneuritis in pigeons.

It is readily seen that pigeons 1-8 gained steadily in weight, while pigeons 9-13, after an initial increase, lost weight persistently until they developed polyneuritis. Upon the ingestion of vitamine substance, as indicated, all symptoms of polyneuritis disappeared, and




Birds received 30 grams of polished rice daily.
*Pigeons developed polyneuritis; one gram of vitamin substance given and continued on alternate days. Pigeons 11 received no vitamin substance and died the following day.

tive in preventing beri-beri and scurvy, it was generally believed to be the missing factor in what might be designated as a "diet of sufficiency."

Since that time numerous experiments have been made, with some measure of success, to apply in practice the theory that the substance known as "vitamin," if prepared in a stable and suitable form, would prove the birds started to gain in weight. Pigeon 11, which received only polished rice, developed polyneuritis on the 28th day and in the absence of vitamine administration, died the following day.

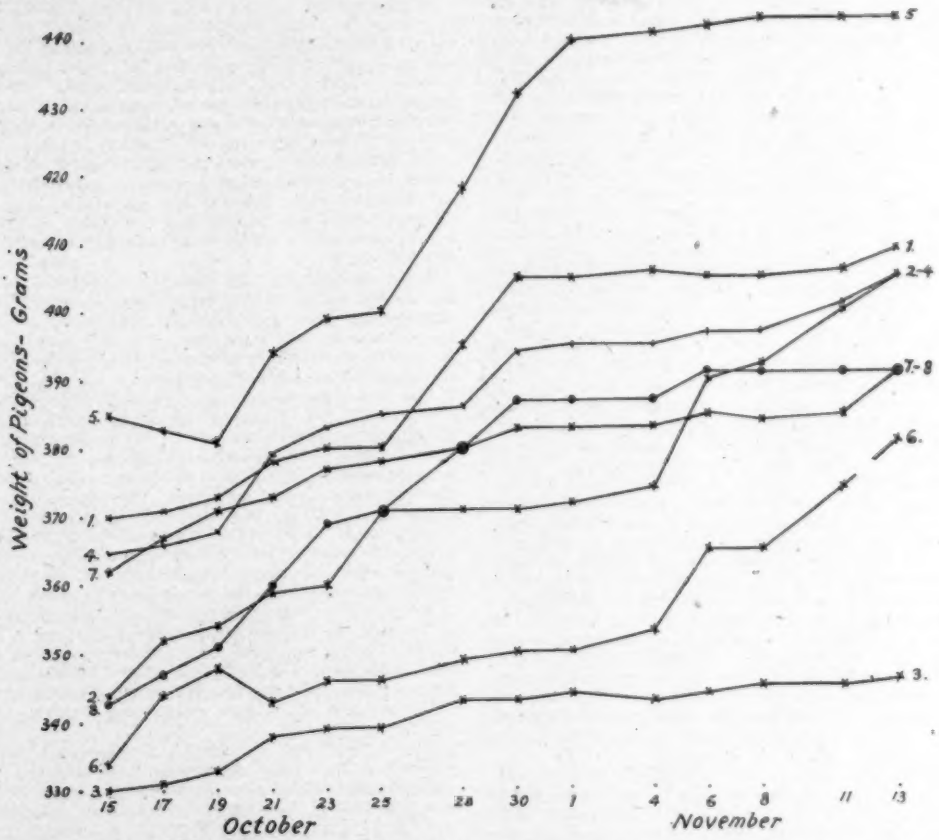
It appears from the foregoing that all of the vitamine products used possess the requisite properties: (a) the ability to prevent the onset of polyneuritis; (b) the ability to cure polyneuritis, and (c) the ability to either maintain or to increase body weight.

From the Research Laboratories of the Grain Chemical Company, New York City.

| Pigeon | OCTOBER 15 | 17 | 19 | 21 | 23 | 25 | 28 | 30 | NOVEMBER 1 | 4 | 6 | 8 | 11 | 13 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | gm. | gm. | gm. | gm. | gm. | gm. | gm. | gm. | gm. | gm. | gm. | gm. | gm. | gm. | gm. |
| 1 Z | 370 | 371 | 373 | 376 | 380 | 380 | 395 | 405 | 405 | 406 | 405 | 405 | 406 | 409 | |
| 2 Z | 344 | 352 | 354 | 359 | 360 | 371 | 371 | 371 | 372 | 374 | 390 | 392 | 400 | 405 | |
| 3 KV | 330 | 331 | 333 | 338 | 339 | 339 | 343 | 343 | 344 | 343 | 344 | 345 | 345 | 346 | |
| 4 KV | 365 | 366 | 368 | 379 | 383 | 385 | 386 | 394 | 395 | 395 | 397 | 397 | 401 | 405 | |
| 5 A | 385 | 383 | 381 | 394 | 399 | 400 | 418 | 432 | 440 | 441 | 442 | 443 | 443 | 443 | |
| 6 A | 334 | 344 | 348 | 343 | 346 | 346 | 349 | 350 | 350 | 353 | 365 | 365 | 374 | 381 | |
| 7 K | 362 | 367 | 371 | 373 | 377 | 378 | 380 | 383 | 383 | 383 | 385 | 384 | 385 | 391 | |
| 8 K | 343 | 347 | 351 | 360 | 369 | 371 | 380 | 387 | 387 | 387 | 391 | 391 | 391 | 391 | |
| 9 (D) | 356 | 358 | 362 | 376 | 379 | 373 | 370 | 367 | 360 | 355 | 349 | 344 | *320 | 324 | 340 |
| 10 (Z) | 357 | 366 | 368 | 374 | 367 | 365 | 351 | 337 | 325 | 303 | 300 | *300 | 300 | 310 | 321 |
| 11 | 374 | 377 | 380 | 380 | 383 | 373 | 354 | 339 | 327 | 319 | 324 | 311 | *280 | Died | Nov. 12th |
| 12 (A) | 308 | 310 | 315 | 315 | 318 | 314 | 311 | 295 | 280 | 275 | 280 | 275 | *275 | 300 | 302 |
| 13 (KV) | 405 | 407 | 414 | 425 | 425 | 417 | 399 | 389 | 384 | 362 | 362 | 351 | *345 | 350 | 359 |

*Polyneuritis developed.

EXPLANATORY—All pigeons were given 30 gm. of polished rice daily. In addition pigeons 1-8 received on alternate days one gram doses of various vitamin substances, Z, KV, A. and K.
Pigeons 9, 10, 12 and 13 received only polished rice until polyneuritis developed,* when a one-gram dose of the vitamin substance D, Z, A and KV was given to the pigeons respectively. These doses were then continued on alternate days. Pigeon 11 received polished rice only.




Birds received 30 grams of polished rice daily plus one gram of vitamin substance on alternate days.

In addition to their substantial vitamine content, all the substances are rich in nitrogen and in phosphorus, the greater portion of which is in organic combination. Preparation Z, to which we have given the name "Vitaphos," seems to have shown the best results and has consequently been chosen for clinical investigation for the purpose of determining its value as an aid to nutrition.

The diseases of nutrition as noted by Funk in his book "Die Vitamine" are as follows: Beri-beri, scurvy, pellagra, rickets, deficient growth and sprue. It is hoped that "Vitaphos" will prove of value, not only in the diseases enumerated, but also in the conditions leading up to them, and wherever a deficient dietary is responsible for a lack of body growth or for a failure on the part of the agents of metabolism, in non-pathologic conditions, to maintain proper body nourishment.

"Vitaphos" is prepared from corn and autolyzed yeast. It is a grayish white powder practically tasteless and odorless, and devoid of toxic properties.

Further animal experimentation is under way, and the results will be published in an early issue.

The clinical tests are being conducted in public institutions, as well as in private practice, by men of standing in the medical profession and their findings will be published as soon as sufficient data is at hand to justify a conclusion.

# Public Health

## The Nationalization of Public Health.

George M. Price gives the war program of the United States Public Health Service, as outlined by Surgeon-General Rupert Blue in the recent issue of Public Health Reports, No. 39, September 27, and says it is most opportune and of great significance. The program involves what practically amounts to a nationalization of public health activities by the federal government through a far reaching and comprehensive control of disease prevention, sanitation, and public health education. The recent trend of events has clearly demonstrated that the protection of the health and the conservation of the man-power of the nation is a primary function of the federal authorities and can only be accomplished with efficiency when undertaken on a nation-wide scale.

The program, if accepted, is destined to revolutionize public health activities in the country and should scarcely be regarded as a temporary war program limited to cantonments or war industrial centers. It is destined to mark a new era in the public health control in time of reconstruction as well as of peace. The dismal bankruptcy of the hitherto prevalent methods of localized, unstandardized, non-uniform, often incompetent and frequently politically-ridden local and municipal health control, has already been clearly demonstrated; partly by the frantic efforts of the control of the present pandemic of influenza, and, principally, by the extremely large percentage of rejections for physical unfitness of men in their prime, as shown in the National selective draft. Contrasted with these acknowledged failures, the splendid achievements of centralized control by the surgeon-general of the army and the sanitary control of the cantonment areas by the Public Health Service stand forth as an example of enlightened, scientific and comprehensive public health control by federal authorities. Peace, no less than war, demands its unified control and command; and the industrial and civic armies, no less than the military, need their generals and their marshal.

The proposed expansion of the United States Public Health Service, as outlined in the surgeon-general's report, involves a national control of rural, municipal, railway and industry sanitation, the prevention of certain diseases through national efforts, a uniform control and standards of water, milk and sewage disposal systems, a uniform collection of morbidity reports, the adoption of minimum national health standards and the conduct of a nation-wide campaign of health education.

Rural, municipal, railway and industrial sanitation and hygiene are to be under the control of the Public Health Service.

As to rural sanitation, it is proposed to give federal aid for extending the establishment of adequate country town organizations, for the detail of specially trained officers to co-operate with local health authorities in extensive campaigns for sanitation, for the study of improved methods of rural sanitation, and for the widespread dissemination of rules for the improvement of rural communities and populations.

The project as to municipal sanitation recommends a campaign for the full time employment of health officers, the enactment of laws on and the enforcement of reporting of communicable diseases, the provision for safe water and milk supplies and of sewage disposal, the establishment of community health centers, and the co-operation with municipal authorities in all improvements of municipal conditions.

In respect to railway sanitation, it is proposed to consolidate under the Public Health Service all railway sanitation, including the protection of railway employees by adequate health measures, the protection of the public by sanitary supervision of milk, water and food supplies, the sanitation of stations, terminals, and the prevention of the spread of communicable diseases, etc.

The program as to industrial sanitation and medicine includes the establishment by the service, in co-operation with the Department of Labor, of minimum standards of industrial hygiene and the prevention of occupational diseases; the improvement of the sanitation of industrial communities; the medical and sanitary supervision by the Public Health Service of civil industrial establishments, owned and operated by the federal government; the establishment of dispensaries and hospital facilities for the use of government employees, and the securing of adequate medical and surgical supervision of employees in industrial establishments by competent medical men, to be appointed as officers of the Public Health Service, to be paid a nominal salary by the Public Health Service to be supplemented by the industrial establishment.

The diseases, the prevention of which the project includes, are malaria, typhoid fever, hook-worm, pellagra, tuberculosis, venereal diseases, and diseases of infancy and childhood.

Disease prevention is to be accomplished by the dissemination of knowledge of disease and the methods of control, by country-wide surveys, the appointment of a corps of expert diagnosticians, the establishment of clinics, dispensaries and hospitals, and the diagnosis and free distribution of certain remedies (this applies to venereal diseases); also the hospitalization of cases of tuberculosis, whenever practicable for the extension of active propaganda and traveling clinics. In the case of diseases of infancy and childhood, the promotion of prenatal care, the accurate registration of all births, the educational measures for adequate care of babies at home, and the instruction of mothers by visiting nurses provided for, likewise the care of children of pre-school and school age.

In the matter of water supply, the project mentions a nation-wide campaign for safe water supply by extensive surveys of water supplies, laboratory analysis when necessary, the introduction and extension of methods of water purification, and the stimulation of communities to receive safe water supply through local and national organizations.

A nation-wide campaign for safe milk is to be undertaken through an adequate inspection of production and distribution of milk and the establishment of municipal plants for pasteurization and distribution.

Proper sewage disposal will, according to the project, tend to control intestinal diseases such as typhoid fever, dysentery, diarrhea and hook-worm. National campaigns for safe methods are proposed for the extension of water-carriage sewerage systems wherever practicable, elimination, within municipal limits, of cesspools and privies, installation of sanitary privies in rural communities, and the establishment of minimum standards of permissible pollution of streams, lakes, etc.

The project recommends the establishment of uniform health standards for communicable diseases, industrial hygiene, sewage disposal, water supplies and purification, community sanitation, illumination, heating and ventilation of public buildings and schools, also a nation-wide campaign of public health education.

Whenever possible, the project involves the co-operation of the United States Public Health Service with the Red Cross national and state organizations, the Council of National Defense, national and state, the state and municipal health departments, state industrial commissions, medical corps, and the state and national health associations.

The above progressive program will undoubtedly invite and create much discussion among public health authorities. Although the measures outlined by the surgeon-general are to be concentrated on communities congested by the establishment of cantonments or of war industries, and, which fall below the minimum health standards, the probabilities are that it cannot and will not stop there. The inclusion of rural sanitation, which is not always applicable to cantonment and war industrial centers, and the extension of control over water supplies, milk supplies, sewage disposal, etc., clearly demonstrate that eventually the whole country must be involved.

Many public health authorities will also doubt the wisdom of limiting the project to the control of the few diseases mentioned, leaving out pandemics like influenza and others, which manifestly need a nation-wide control. Nor would it be justifiable to include the prevention of diseases of infancy and childhood and to exclude cancer and diseases of middle and old age.

The opinion will undoubtedly be expressed that the national control of the milk supply should be widened to a national food supply control. On the whole, the projected expansion of the activities of the United States Public Health Service is in accord with the progressive trend of modern thought, and is worthy of most careful and thoughtful consideration. If such a project is to be launched, the present organization of the United States Public Health Service is the one to take it under its control.

The history of this branch of service dates back to 1798, when Congress passed an act for the relief of the sick and disabled seamen. The care of these has always been a part of the functions of the Treasury Department, hence the inclusion of the Marine Hospital Service under this department. In 1902 a change of name was made from Marine Hospital Service to United States Public Health and Marine Hospital Service, and in 1912 to United States Public Health Service.

The proposed expansion of the functions and the scope of the United States Public Health Service and the broadening of its activities must inevitably lead to a realization of the hope of progressive sanitarians for the final liberation of the United States Public Health Service from the Treasury Department, and for the passing by Congress of an act to establish a federal Department of Health with a secretary in the cabinet.

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## The Force of Sex in America.

Henry Adams, in his autobiography, indicts America for her failure to utilize the force of sex as it has been utilized in Europe, or at least he makes a comparison to the disadvantage of the former. He says:

"The woman had once been supreme; in France she still seemed potent. . . . Why was she unknown in America? Anyone brought up among the Puritans knew that sex was sin. In any previous age sex was strength. At the Louvre and at Chartres, as he knew by the record of work actually done and still before his eyes, was the highest energy ever known to man, the creation of four-fifths of his noblest art, exercising vastly more attraction over the human mind that all the steam engines and dynamos ever dreamed of; and yet this energy was unknown to the American mind. An American Virgin would never dare command; an American Venus would never dare exist. . . . Symbol or energy, the Virgin had acted as the greatest force the western world had ever felt, and had drawn man's activities to herself more strongly than any other power, natural or supernatural, had ever done."

Adams comes to the conclusion that during such times as the thirteenth century man held a high idea of himself as a unit in a unified universe, whereas to-day man has become a study in multiplicity, with much of the sexual left out, or perverted. In the olden time he accomplished prodigies, while to-day he—makes locomotives.

Characteristically, the "typical" American cannot dissociate the idea of sex force and how it operates upon man from gross conceptions. He probably would not know what Adams was driving at.

What he does understand has to do with the obscene, and what he can create runs toward dynamos and explosives. Therefore his children can know nothing of sexual life or truth through him; therefore he will never paint a madonna; therefore his precious monogamy will continue to violate the decencies.

## The Health Insurance Menace.

Among the decrees and other official documents of the Soviet Government of Russia there is a list of Instructions regarding the Organization of Soviets. We find that Order Number 10 reads as follows: A Medical-Sanitary Department must be organized, whose duties shall be sanitary-hygienic supervision, the organization of medical aid accessible to all, sanitary equipment of urban and rural settlements, etc.

*The organization of medical aid accessible to all.* This phrase is a most significant one.

Professor Barker, of Johns Hopkins University, in a recent article in the *New York Medical Journal*, remarks as follows: "How are patients to gain the advantages of specialization in medicine and at the same time escape the dangers of a one-sided study? This is a question that must be faced squarely in order that the right answer may be found." Professor Barker's solution is group diagnosis, with interpretation of the results and therapeutic applications by an internist whom he calls an integrator. This is all right as far as it goes, but it is available only to the rich and to a limited hospital class.

The situation appears to be this, that a solution is demanded which will involve neither health insurance nor Bolshevism, and there is only one possible way out. We are between the deep sea and the devil, plainly enough, and must find our way out very soon. Evil forces will play about us until constructive genius ends an intolerable state of affairs. It is impossible to conceive such disaster coming upon the American profession as health insurance has wrought upon our British and Continental brethren.

State Socialism and Bolshevism have their programmes relentlessly worked out. The one means paternalism, the other proletarian dictatorship; both involve exploitation of the medical profession.

At last, however, we are realizing that it is better to prevent disease than to tinker with it after its seizure of the toiling masses. At last our business men have come to understand that the ends of justice and economy are best met by "cleaning up." They are actually willing to speed up on sanitation and hygiene to a point where decent working and living conditions shall prevail. Health insurance and Bolshevism can menace only such industrial communities as ignore justice and the principles of preventive medicine. The simple truth is that the Golden Rule pays from whatever point considered.

The Graves Bill, introduced in the New York Senate on January fifth, and backed by the Associated Manufacturers and Merchants of the State, provides for the reorganization of the State Department of Health and includes appropriations of $2,250,000. On the same day, Assemblyman Bewley introduced it in the lower chamber.

The medical profession can support with entire consistence a bill which aims directly to prevent disease and which if enacted into law will check health insurance propaganda.

We have our opportunity to aid in effecting this legislation and shall richly deserve the consequences of failure, if failure comes.

The health insurance propaganda has at least served the purpose of stimulating progress in public health measures and methods.

### Liberalism and Sex Hygiene.

Perhaps the real reason why the sexual hygiene programme has lagged in this country has been because we were not really ready for it; that is to say, an extensive foundation of liberalism needed to be laid first. There was no use trying to get anywhere along the lines of enlightenment in matters of sex until some considerable progress had been made in other matters.

We are beginning to lay a good foundation now. Our intellectuals are increasing in numbers and are espousing good causes, regardless of the opinions of the so-called master class and of the well known tyrant whom the bourgeoisie have been trained to fear and worship —Public Opinion. And they have made the wonderful discovery that the world is safe for intellect, if one really possesses it. In other words, what began to take place in Europe fifteen years ago is now beginning to take place here.

It is a fact that they have now at Harvard a Liberal Club. It is about a year old. More than that, liberal clubs are being organized in other universities, with intercollegiate affiliations. These clubs meet weekly and discuss live questions. We cite these facts because they show that the colleges are ceasing to produce men out of whom all capacity for liberalism has been fearfully and wonderfully extracted. These things give hope that some reason for the existence of our American colleges may yet become apparent, hitherto an obscure problem. But the point is that this liberal movement is beginning to pervade all sorts of groups whom we have always considered quite hopeless. After it becomes commonplace and conventional to reveal intelligence, and after a few precedent matters have been disposed of, it will be in order to do something about sexual hygiene—by which we mean something different from the measures (?) favored by canting Anglo-Saxon hypocrisy and ineptitude.

---

### For Influenza and Pneumonia Convalescents.

Change of scene adds materially to the rapidity of convalescence from influenza or pneumonia. To patients living within striking distance of the New Jersey coast this prescription is offered with personal knowledge of its efficacy:

℞

One return railroad ticket to Atlantic City.
Ten days at the Chalfonte.
Strengthening food.
Fresh air ad libitum.

Sig. Take as soon as able to travel and follow physician's directions carefully.

The air of Atlantic City is free from dust and is invigorating and rejuvenating. The temperature does not show the marked changes which are indicated along other parts of the northern coast and the atmosphere of the place makes for improvement of health.

This daily regime has been found useful for influenza and pneumonia convalescents:

FIRST AND SECOND DAYS.

8:00 A. M.—Arise and warm salt water bath.
9:00 A. M.—Breakfast.
10:00—11:00 A. M.—Rolling chair ride on board walk.
11:00— 1:15 P. M.—Rest in well ventilated room.
1:15 P. M.—Luncheon.
2:30— 3:30 P. M.—Rolling chair ride.
3:30— 6:30 P. M.—Rest.
6:30 P. M.—Dinner.
9:00 P. M.—Retire.

THIRD AND FOURTH DAYS.

8:00 A. M.—Arise and salt water bath.
9:00 A. M.—Breakfast.
10:30 A. M.—Walk from Chalfonte to Kentucky Avenue and return—8 short blocks.
11:00—12:00 A. M.—Rolling chair ride.
12:00— 1:15 P. M.—Rest.
1:15 P. M.—Luncheon.
2:30— 4:00 P. M.—Rolling chair ride.
4:00— 6:30 P. M.—Rest.
6:30 P. M.—Dinner.
9:00 P. M.—Retire.

FIFTH AND SIXTH DAYS.

8:00 A. M.—Arise and salt water bath.
9:00 A. M.—Breakfast.
10:30 A. M.—Walk from Chalfonte to Garden pier and return—10 short blocks.
11:00—12:30 P. M.—Rolling chair ride.
12:30— 1:15 P. M.—Rest.
1:15 P. M.—Luncheon.
2:30— 4:00 P. M.—Rolling chair ride.
4:00— 6:30 P. M.—Rest.
6:30 P. M.—Dinner.
9:00 P. M.—Retire.

SEVENTH AND EIGHTH DAYS.

8:00 A. M.—Arise and salt water bath.
9:00 A. M.—Breakfast.
10:30—12:00 A. M.—Walk from Chalfonte to Heinz pier—7 blocks—rest in enclosed porch and return.
12:00— 1:15 P. M.—Rest.
1:15 P. M.—Luncheon.
2:30— 4:30 P. M.—Walk from Chalfonte to Marlborough-Blenheim—7 blocks and then rolling chair ride.
4:30— 6:30 P. M.—Rest.
6:30 P. M.—Dinner.
9:30 P. M.—Retire.

NINTH AND TENTH DAYS.

8:00 A. M.—Arise and salt water bath.
9:00 A. M.—Breakfast.
10:30—12:30 A. M.—Walk from Chalfonte to Royal Palace—12 blocks, rest and return.
12:30— 1:15 P. M.—Rest.
1:15 P. M.—Luncheon.
2:30— 5:00 P. M.—Walk to Marlborough, then rolling chair ride.
5:00— 6:30 P. M.—Rest.
6:30 P. M.—Dinner.
9:30 P. M.—Retire.

In resting the patient should be in a room thoroughly ventilated and protected from drafts. By carrying out such a program, fresh air is breathed practically every moment of the 24 hours.

Convalescents who go to Atlantic City tired, pale and wan, speedily regain color and strength and are able, even in ten days, to re-establish themselves physically.

---

### Evacuation Hospital Commended.

For its admirable work in handling battle casualties at Chateau Montanglaust, June 15 to August 11, Evacuation Hospital No. 7, American Expeditionary Force, commanded by Lieut. Col. W. H. Tefft, M. C., U. S. A., has been highly commended by direction of General Pershing. The letter of commendation, which is dated September 4 and signed by Brig. Gen. Le Roy Eltinge as deputy chief of staff, reads:

"1. I have noted the remarkable record established by Evacuation Hospital No. 7 while serving at Chateau Montanglaust from June 15 to August 11, during which period the largest number of patients, battle casualties, that has yet received attention from a like unit in the same length of time, was cared for and evacuated by hospital train or motor transport.

"2. The hard work and tireless energy of the officers, enlisted men and nurses who, during times of greatest stress, worked continuously, often without sleep and without food, have resulted in saving many lives and deserves the highest praise. Such loyalty and efficient service by medical units directly contribute to winning the victory, not only by saving the lives of men who later return to the fighting line, but also by inspiring in the troops a confidence in your service which enables them to brave the greatest dangers with that high spirit and courage which are irresistible.

"3. I desire my appreciation of the services of your unit to be conveyed to each member thereof who assisted in making this enviable record, and shall be glad if you can do so in writing to each individual concerned."

# Miscellany

CONDUCTED BY ARTHUR C. JACOBSON, M. D.

### Sangrados, Old and New.

Students of the literature of New England will recall the Jonny Cake Papers, that extremely clever collection of Thomas R. Hazard's newspaper gossip. There is a picture among the Papers of a practitioner of the early days which rather sets one to shivering and to wondering whether such a character ever really existed. Can it be that there were physicians as bad as this? Perhaps Hazard's satirical shafts must be discounted a bit. However, this is what he has to say about a certain Dr. Sangrado:

"My father sent for Dr. Sangrado, who lived in the two-story house still standing at Curtis' corner. . . . The excessive mortality among Sangrado's patients was the real cause of his acquiring such renown in the art of healing, as about one in ten of his patients wholly or partially recovered, which, of course, was credited by an ignorant community to the skill of Sangrado, who attributed the death of the other nine to the virulence of the mortal malady; whereas the truth was, as was in later years fully exemplified, the nine were actually slowly tortured to death by the physician, whilst the tenth got well in spite of his death-dealing practices. This Curtis' Corner Sangrado was undoubtedly the rider on the pale horse referred to in the Apocalypse, who went about with his lancet and saddle-bags stuffed with mercury, jalap, Dover's powder, opium, and other abominations, and his name that sat on him was Death, and Hell followed after him."

This is quite the roughest indictment of an early American practitioner that we remember to have seen. In all likelihood the doctor practised under hard conditions, in a community as distinguished for bad sanitation as for piety, and visited by pestilences that left an inevitable wake of death in their course.

Poor Sangrado was probably about as badly off as some of us have been of late, in certain communities, in connection with the influenza epidemic.

Perhaps some Hazard is now engaged in immortalizing a twentieth century Sangrado who rode a pale auto during the recent epidemic and distributed much acetylsalicylic acid.

# War Medicine and Surgery

### Fractures in Warfare.

Sir Arbuthnot Lane of London says that during the four years of the war no branch of surgery has more closely engaged the attention of the surgeon, or called for more skill and care on his part, than has the treatment of injuries involving the solution of continuity of bones. In considering the treatment of fractures, surgeons are somewhat inclined to confine their attention to such compound fractures as are produced by projectiles, forgetting that a large number of these injuries result from other incidents of warfare, such as mine explosions, aeroplane accidents, falls from horses, vehicles, over wire or into trenches, from blows, and in innumerable other ways. The fractures which occur in warfare may be conveniently classified under these headings:

1. Simple fractures.
2. Compound fractures not produced by projectiles.
3. Compound fractures produced by projectiles.

As regards simple fractures, this war's experience might lead the observer to conclude that few injuries have been treated so unsatisfactorily as these. This appears to be due either to a want of familiarity with the mechanics of fractures, or to such an imperfect operative technique as to suggest but little knowledge of the very important details which a surgeon should possess, when he is called upon to operate on fractured bones. In many instances the ends of the fragments had been mutilated, and the limb correspondingly shortened or deformed in attempts to facilitate the apposition of the fractured extremities and the restoration of the bone to its normal form. Sometimes the fragments were found to overlap, forming varying angles with each other; and at other times their axial relationships did not correspond, so that the lower fragment was abnormally rotated on its long axis upon the upper to an extent sufficient to produce considerable limitation of the function of the part. It not infrequently happened that the plate or plates employed were too frail or too short to hold the fragments securely in apposition, or they were improperly attached, or an insufficient number of screws were used.

Occasionally, after the operation had been performed very efficiently, the surgeon had not taken adequate precautions to keep the limb at rest. An abnormal strain was consequently exerted on the screws and in the junction, so that non-union or mal-union of the fragments resulted, and the patient was left with an extremity impaired in its usefulness. The rule that should guide a surgeon in having recourse to operation in any particular case of fracture seems to be perfectly simple. If he is satisfied that he cannot, by manipulation under an anesthetic, prolonged extension, etc., replace the broken fragments of a bone in a simple fracture in accurate apposition, and if he believes that failure to restore continuity of the fragments is likely to interfere with the wage-earning capacity of the individual or with the requisite usefulness of the limb to the patient, it is his duty to operate and to restore the bone to its original form and function. He is also under an obligation to his patient to equip himself so as to be in a position to carry out the details of such an operation efficiently and with safety to the patient. There must be no compromise in this particular.

Operations for disability resulting from non-union of fragments in a simple fracture, or from overlapping of fragments, or from union of the fragments so that their long axes do not correspond, are at times very difficult. This is particularly the case when the fracture is in the vicinity of important nerves, as, for instance, in that portion of the radius surrounded by the supinator nerves through which the branches of the musculo-spiral nerve pass to their terminal distribution. Fracture of the radius in this situation is by no means uncommon, and the result of treatment by splints and extension is often very unsatisfactory, since it is difficult to prevent overlapping and to avoid divergencies in the axial rotation of fragments by any known method. When the fragments have finally united, operative interference is complicated by the necessity of having to divide the bone often in two places in a limited space in the immediate vicinity of nerves, damage to which would do much to detract from the benefit that would result from the perfect restoration of the bone to its normal form and function. To place the fragments in linear continuity is the least troublesome part of the operation as compared with restoring axial continuity, since the outline of the blended fragments becomes very considerably modified in the interval of time which has elapsed between the receipt of the injury and the operation.

Again, in old-standing fractures of the shaft of the radius at the junction of the upper three-fourths with the lower fourth, not only is there considerable difficulty in correcting the axial rotation of the lower fragment, but very great resistance is experienced in bringing out the lower fragment from its abnormal approximation to the ulna, which takes place because of the contraction of the soft parts between those bones. These operative difficulties are accentuated by the early and rapid wasting of the compact cancellous tissue of the lower fragment, rendering it very fragile and friable, and so soft that the grip of the screws, which are employed to secure the steel plate, is very insecure and transitory.

Owing to the teaching in the text-books, surgeons generally have a very incorrect idea of the length of time required for firm consolidation of the callus between the ends of recently fractured bones. As a result of this, after the fragments have been secured in accurate apposition by means of plates and screws, the splint or other apparatus is frequently removed at too early a date, and the screws and plate and soft junction may yield to the excessive strain so that deformity and disability result.

In the case of fractured bones of old standing, in which an operation is performed for non-union or axial deformity, it is well to remember that the period required to ensure firm bony union between the coöpted fragments is very much longer than it is in operations performed for recent fractures. Lane has seen much disappointment result from want of knowledge of these conditions.

As regards compound fractures not produced by projectiles,

the surgeon must obtain accurate apposition of the fragments, if he possibly can, by manipulation, traction, and splinting. In circumstances in which it is exceedingly unlikely that any infection has taken place, a plate may occasionally be employed with advantage. These fractures vary in character in their degree of infection, sometimes being hardly, if at all, more serious than simple fractures, while at other times they have associated with them all the risks of a compound fracture produced by a projectile. The commination is also very much less, as a rule. A foreign body is rarely embedded in the tissues about the fracture, and this causes much less anxiety..

In the case of compound fractures produced by projectiles, while it is most important to excise any damaged soft parts and to remove obviously useless fragments of bone at as early a date as possible, no special treatment of the bone is called for, other than extension sufficient to bring the fragments into apposition, etc. The importance of dealing with these injuries as soon as possible was thoroughly realized by that great surgeon, Baron Larrey. He devised a flying ambulance by which he was able to bring aid to the wounded within a very short period of the receipt of the injury. His results were little short of wonderful, and have not been excelled, even if they have been equalled, during the war. It took us three years to rediscover and apply his radical methods in the early treatment of wounds.

Owing to the presence of a wound, often of considerable size, in these compound fractures, there is a free exit for the effused blood and the inflammatory exudation which is poured out at a very early period. Consequently the soft parts, which form the ties in the length of the limb, are not shortened up to anything like the degree they are in simple fractures, and afford comparatively little resistance to the extension of the fragments on one another, so that overlapping of the broken ends is readily avoided if suitable means are adopted. The treatment of these fractures has been greatly facilitated by the methods devised by Major Sinclair and by the employment of X-ray apparatus at the bedside of the patient, allowing accurate observation of the results of treatment from time to time.

Prof. Willems of Belgium, in dealing with wounds of joints, has brought about one of the greatest advances in war surgery. We were in the habit of keeping at rest the joints which were more or less severely damaged by projectiles, hoping to obtain in some few cases a movable joint but in the large majority being satisfied if a fixed joint in the best possible position resulted. He has demonstrated that by immediate voluntary movement it is possible to expect a movable joint in almost every case, even if it is necessary, when much of the articular surface has been removed, to secure the joint temporarily or permanently by some external support. The joint is freely incised if necessary, the apertures for drainage being closed when the secretion becomes sufficiently scanty. Irrigation by antiseptic solution is not employed. The frequent voluntary movement of the joint forms the very effective means for evacuating its contents and for bringing recently effused white corpuscles to bear on any organisms which may be present in the wound. I have seen many limbs rendered useless by excessive removal of fragments of bones, especially in comminuted fractures of the elbow and ankle-joint.

Early in the war, excisions of the elbow joint were frequent, but later it was realized that an elbow joint fixed at a useful angle afforded a more efficient and useful arm. Still later the method of early voluntary movement, suggested by Willems, has given incomparably better results, since a freely mobile joint is not uncommonly obtained in conditions where previously such results could not have been hoped for.

Operations for the restoration of very deformed bones to their normal form and function are often very extensive and tedious, and not infrequently make a great demand on the skill and resourcefulness of the surgeon. If a surgeon fails to succeed, occasionally, in an operation on a simple fracture, either recent or of old standing, in which the conditions are relatively simple, it is easy to understand that in the much more complicated state of things which exists in a deformed and useless bone resulting from a bullet or shell wound, he will have a correspondingly large proportion of failures to avoid sepsis. Lane has noticed that these accidents occur with much less frequency in the practice of those operators who are familiar with the special technique and precautions which these operations call for. At the same time one has to bear in mind the danger that exists from the presence of residual organisms embedded in the tissues, and every precaution must be taken against their existence, either by early free excision of damaged soft parts or by shortening the period of suppuration in the wounds.

Before any operation on a deformed or disabled bone is undertaken, every possible means should be employed to determine the existence of buried organisms. Very vigorous massage of the part, exercise as violent and prolonged as the patient can stand, the congestion of the affected part by a rubber band, and the use of multiple vaccines or of the original organism if its nature is known, all furnish effective means of obtaining a reaction should organisms be present in the tissues. In this manner it is usually possible to reduce to a minimum the risk of operating on a case containing living germs. Should any reaction occur, the above procedures can be employed to stimulate the tissues to destroy the organisms. The importance of these precautionary measures is only too obvious to the surgeon who is frequently called upon to perform operations on such deformed bones.

If any infection should arise after such an operation, early drainage, disinfection, and prompt vaccine treatment will usually save the situation. In a certain proportion of cases it will not be necessary to remove the plate, or its removal may be postponed till the fragments have united.

Grafts of bone are often very useful to fill up large gaps in a long bone or to secure the union of fragments when they have not united to one another. This is particularly the case in fractures of the tibia, the radius, the ulna, and the lower jaw, where large areas of bone have been removed by a projectile. After fixing the fragments of the tibia securely by means of a large plate and screws, a considerable proportion of the anterior portion of the sectional area of one of the fragments of the shaft can be removed with perfect accuracy by means of a saw, a carpenter's chisel and a mallet. It can be filled into the vacant space and secured in position by small plates by wire or by screws made out of the tibia. When a portion of the radius or ulna has to be replaced, the tibia usually affords the best source from which a graft can be obtained. In cutting the graft for this purpose it is well to carry the section sufficiently deep so as to include the cancellous tissue of the shaft in the graft. Occasionally a rib will supply a fragment of suitable length and thickness.

In replacing a portion of the lower jaw after the fragments have been immobilized by a suitable interdental splint, the gap may be supplied from the crest of the tibia or rib. Umbrella wire may be used to retain the fragments securely in position. At the Queen's Hospital, Sidcup, where the greater proportion of these cases are treated, some of the surgons, in order to secure the graft, employ with success screws made from a portion of the tibia; while others prefer to shape the fragments and grafts so that the latter, by interlocking between the end of the jaw, remains in position without any metal or bone medium. Time will show which method affords the greatest advantage in varying conditions.

The most striking aspect of the introduction of grafts of bones to replace portions of the lower jaw is the early stage at which such an operation can be performed without fear of infection and of necrosis of the graft. Even if some suppuration ensues, it does not follow that the graft will necessarily necrose. This would suggest that the vitality of the tissues of the face is distinctly greater than that of the trunk or extremities. Costal cartilage affords a very useful material to replace loss of substance of the vault of the skull or of the malar bone, or to construct a framework for a new nose or to make a foundation for an artificial eye. It lives much more readily than bone, and is handled with greater facility.

### CONCLUSIONS.

The conclusions that may be arrived at as to the operative treatment of fractures produced by projectiles are:

1. That only in very exceptional circumstances is it advisable to fix fragments of broken bones together by means of plates and screws whilst the wound is foul.

2. That if, for certain reasons, such a procedure is deemed necessary, screws should not be inserted near the broken extremities, but as far from the seat of fracture as possible.

3. That it is advisable to postpone operative interference till the wounds have healed for some considerable time and until the tissues are, in all probability, free of organisms. This can usually be determined with reasonable certainty.

4. That if any apparently septic focus is observed during an operation, a culture and a vaccine should be obtained from it, and employed at once should symptoms of infection of the wound develop.

5. That, should there be any definite suspicion of the presence of latent sepsis, irrigation by Carrel's or similar method must be adopted at once. If not, the wound should be closed completely at the time of operation.

6. That every attempt should be made to avoid any shortening of the limb, or to reduce it to a minimum.

7. That the apposition of the whole areas of the broken ends is not necessary, since the interval will fill up subsequently

by bone if suitable means are adopted. Fragments of bone or callus should be saved and employed to fill any interval between the pieces of the shaft.

8. That much heavier steel plates are required in this class of case than are usually employed in the less comminuted fractures of civil life. It is most important that the muscles and joints, which are in relation with the fractured bone, shall be moved voluntarily by the patient as soon as possible after the operation, in order to avoid that stiffness and limitation of movement that so often complicate these fractures. This is especially the case in the joints of the knee, ankle, and foot. In order to obviate this trouble, without risking the security of the junction, the plates which are employed to retain the fragments in position must be as long and as strong as circumstances will permit. They should be secured by as many screws as possible. The plates that are often employed are quite inadequate for the purpose. It is obvious that such early treatment cannot be adopted when the fragments are very fragile and the grip of the plate and screws insecure.

9. That providing no strain shall be exerted on the junction likely to develop non-union, the sooner the patient who has been operated on for fracture of one or more long bones of the leg is got up and about, the more bone will be deposited and the more rapid will be the repair at the seat of fracture. For this purpose a good ambulatory splint is a necessity in certain cases.

10. That, should the interval between the fragments be so considerable that union is not likely to take place, even after prolonged congestion, brought about by the use of an ambulatory splint, the fragments should be secured in perfect alignment by a plate fixed vertically behind the centre of the shaft. When this has been done a portion of one of the fragments, which is usually equal in thickness to a third of the total circumference of the shaft, can be sawn and chiselled off and secured over the interval between the fragments, any piece of bone removed to accommodate the graft in the other fragment being fitted to occupy such existing interval as may be left between the bones. If enough material cannot be obtained from the fractured bone to make a graft, it must be got from some other bone.

11. That most of the failures of bone grafting for extensive loss of substance are due to the surgeon depending on the unsatisfactory grip which the graft alone can be made to exert upon the fragments of the shaft. The essence of success depends on the absolute immobilization of the fragments of the shaft on one another, and of the graft upon those fragments. It is obviously ridiculous to attempt to retain the fragments of bone in a useful position by bone grafts alone in these compound fractures produced by projectiles, as it is in any fracture in which the material securing the fragments in position has to bear considerable strain. In grafting bone into gaps in the lower jaw, fixation is supplemented by interdental splints which lock the jaws.

12. That much has been written about wire screws and plates acting as foreign bodies if used in simple fractures, and producing a rarefying ostitis around them. Should such rarefying ostitis exist, it is undeniable evidence that the technique of the operator is faulty and not the procedure. The remedy is in the hands of the surgeon, who must improve his methods. Frequent failures in unskilled hands have led many to attribute their want of success to the employment of steel plates and screws, and to attempt to avoid sepsis by using other and much less effective means.

13. That while the operative treatment of compound fractures produced by projectiles is the most important of all surgical procedures in warfare, it is, perhaps, well to remember that it may demand a degree of asepsis, mechanical skill, resource and judgment in excess of that required for other operations for war conditions.

14. That, besides that of sepsis, usually introduced from without though occasionally developed from a latent infection, hæmorrhage is the chief risk which is associated with these oprations. This can be best avoided by the use of very powerful hæmostatic forceps, which are left in position in the wound for as long as possible during the course of the operation. A ligature is rarely required. It is most important that the wound should be left as dry as possible. When much oozing is expected to follow the operation, a long drainage tube may be left in the wound for twenty-four hours, and so arranged that the extravasated blood may be carried free of the dressings. The removal of the tube does not necessitate any change of dressings, for they are not moistened by the blood.

The relative value of security to convenience has not received the attention it merits, if one can judge by the routine methods which have been adopted in this war. The importance of this can be best illustrated by examples.

For instance, in civilization in town life the possession of a stiff knee-joint, producing a rigid lower extremity, is a constant source of annoyance to the individual and a recurring cause of inconvenience to other members of the community. Such a person can only conveniently occupy certain limited accommodation in a theatre, while his very presence is resented in any public vehicle in which the thoroughfare is limited, as it almost always is.

In innumerable different ways a rigid leg unfits a man for leading with comfort the ordinary life of a town dweller, since the conditions which exist are built up on the supposition that everyone shall be capable of bending the knees. Again, the individual with a rigid lower limb has to occupy such a constrained position when sitting down that an abnormal strain is experienced by the joints and muscles of the lumbar spine and pelvis, and weariness and discomfort result after a very short time. The inconvenience entailed by a rigid leg can be best illustrated by an excerpt from the letter of such a sufferer, who has since had his leg amputated because he could not longer put up with the inconvenience of it:

"For the last four months I have been walking on the stiff leg, which I have found a great hindrance. The only way in which I can sit with any comfort is by placing the leg upon a chair, and this can only be done when at home. In public buildings it is impossible to sit with comfort; while the leg, sticking out straight, is not only a niusance to myself but to those around or near me. This is to be experienced more in theatres and public places, where the limb becomes a source of annoyance to those who wish to pass by me. Unless the rows of seats are fairly well apart, it is impossible to sit in some theatres. I experience the greatest trouble in travelling, especially about London. The only way I can sit in a bus or train is to balance myself on the edge of the seat—a most uncomfortable position—and to bring the foot to the floor. If I fail to do this, my foot must rest on the lap of the person opposite. When I bring the foot to the floor, the limb usually stretches across the compartment, so that it becomes necessary to rise every time anyone wishes to pass. When the vehicle is full it is almost impossible to sit down, as I cannot keep the leg out of the way of the people who are standing. I have also experienced difficulty in bed, as I cannot get the leg into a comfortable position, and my nights are consequently very restless."

In considering the measures that should be adopted in severe wounds about the knee-joint when much bone has been carried away, the surgeon is apt to argue that if he cannot obtain bony ankylosis between the femur and tibia he should amputate the limb, in the belief that an artificial limb will afford his patient the best mode of progression. A rigid limb gives the possessor security at the cost of convenience.

If the patient has a leg which permits of free movement of the tibia on the femur around a transverse axis, in other words, what is commonly described as a flail joint, he can, by wearing an external support, transmit his weight from the pelvis and thigh to the boot. The presence of a ring catch joint enables him to flex his leg in the situation of the knee joint with great facility and rapidity, while the moment the erect posture is assumed the joint locks and the limb becomes for all practical purposes a rigid one. In such a limb security is sacrificed to convenience. This man cannot do the same amount of heavy work that one with a rigid leg can do, but he is more fitted to lead a conventional town life with comfort to himself and with convenience to his fellows.

In dealing with these injuries the surgeon should, therefore, be influenced by the circumstances of the patient in deciding as to the relative advantages of security and convenience in each individual case. Again, while assuming that a rigid limb is much more useful to the laborer than is any form of artificial limb for an amputation through the thigh, the relative merits of a flail limb and of an artificial leg call for our careful consideration.

Apart from the sentimental value which appertains to the possession of one's own leg, inquiry made among a large number of those who have sustained an amputation through the thigh showed that while a good many continued to wear their artificial limbs with comfort and satisfaction, quite a considerable proportion discarded them altogether, or wore them only for intervals of time, or on occasions. Many of them realized that an amputation entailed many subsequent discomforts and disadvantages that surgeons generally were not familiar with, but which are very real to the possessor of the stump.

There is a very great deal to be said for the advantages which the flail joint in the leg affords. While it is the undisputed intention of the surgeon to obtain a rigid limb if the knee joint has to be lost, and that failing it an amputation through the thigh should be performed, it would appear that

in a large proportion of the community the individual is better off with a flail joint suitably supported by an apparatus than with a rigid limb or with an artificial limb.

This is merely an example of the rule "that which is universally accepted as true is always false." The same applies in a lesser degree to the shoulder joint. A humerus ankylosed to the scapula at a suitable angle affords security at the cost of convenience. A humerus moving freely on the scapula affords convenience at the cost of security. For this reason, the patient's habits and circumstances should be considered carefully, before any operation is performed for destruction of the parts about the shoulder joint by projectiles.

On comparing the relative advantages of a stiff shoulder with those of a flail joint, inquiries have shown that while the former gives security the latter affords convenience. The disadvantage of the flail joint is that the process of education of the muscles and the development of a new false joint is very much more tedious than the convalescence of a humerus ankylosed to the scapula, but the general opinion of patients whose life was not a laborious one preponderated largely in favor of the flail joint. They found it more convenient, and every month added to its security and usefulness.

Another injury which is by no means uncommon is that of a compound comminuted fracture of the lower end of the shaft of the humerus not involving the elbow joint from which fragments of bone of some size may have been removed.

In spite of extension in various places the lower end of the humerus tends to become abruptly flexed at the elbow joint, and the end of the shaft comes into relationship with its posterior surface. When the wound has healed there is very often not a sufficient length of lower fragment to permit of its being secured to the shaft by means of a plate. Besides it is usually difficult and sometimes impossible after a considerable interval of time to extend the elbow joint so that the lower fragment shall form a right angle with the ulna and radius. Consequently, any attempt to secure the fragments by plate or wire exposes the junction to a strain which is usually excessive. As the movements of pronation and supination are performed perfectly in the normal elbow joint, and it is impossible to obtain that of flexion and extension in the elbow joint, it would seem advisable to develop a false joint between the humeral fragments which will permit of movement around a transverse axis. Such a joint improves in its functional capacity steadily, if suitable exercises are performed with the object of perfecting it.—(*The Practitioner,* Oct., 1918.)

## The Treatment of Dichlorethylsulphide ("Mustard Gas") Injuries.

Warthin, Weller, Roos and Herrmann of the University of Michigan discuss this subject at length in a splendidly illustrated article. After quoting the literature on the subject the authors set forth this procedure for mild injuries:

Wash immediately, or better, immerse parts one-half to two hours in Dakin's solution (strength of about 0.5 per cent hypochlorous acid). If too irritating, and when the skin is unbroken this is not likely to be the case, dilute the solution or shorten time of immersion. If injured surfaces are very large use full bath; for lesions of the genital region use sitz bath. When immersion of parts is not expedient use wet Dakin's dressings or irrigate with Dakin's solution. If the wet treatment cannot be carried out, the application of dichloramine-T in chlorcosane or chloramine-T in sodium stearate may be used. These procedures will serve a double purpose of chlorinating and rendering inactive any dichlorethylsulphide remaining in the skin, hair follicles, etc., and also disinfecting the damaged skin surface. This primary disinfection of the skin is of very great importance in the prevention of the secondary infections that are so often of a serious character. After the Dakin's solution, use wet dressings, irrigation or bath of sterile hypertonic saline (5 to 10 per cent), alternating with the above Dakin's solution and a sterile physiologic saline, according to judgment, about as follows: Dakin's 1 to 2 hours, hypertonic saline 2 hours, physiologic saline 1 hour, and then repeat until lesions appear and extent of injury can be determined. As long as the lesion remains an erythema continue this treatment during the daytime. At night, dry the skin under aseptic precautions, and apply a vanishing surgical cream containing hypochlorous acid or liberating chlorine, of the type of the chlorazene (chloramine-T, 1 per cent, in sodium stearate) surgical cream, or instead, use wet hypertonic saline dressings. Dusting powders are inadvisable because of crusting and possibility of infection. Chloramine-T and dichloramine-T in full strength powder form are too irritating.

In the case of vesicle formation, empty visicles early under aseptic precautions, by means of a hypodermic syringe or sterile needle with slight pressure upon the vesicle, and allow intact vesicle wall to collapse and seal down upon its base. After this procedure continue with alternating Dakin's and sterile salines, as above. If vesicles are not drained early, the fluid content may, within 4 to 5 hours, coagulate to such an extent that a large coagulum is formed that cannot be removed, and forms a possible medium for bacterial growth. It is very important that skin damaged by mustard gas be protected from trauma. Slight injuries, even ordinary pressures of the body, will cause the development of secondary vesicles or decubitus in the injured areas.

The use of unguents and ointments with oily bases, such as zinc stearate, olive oil, oleum petrolatum, or any form of crude vaseline or other protecting oil, or such air-excluding and infection-including protectives as oiled paper, paraffin sprays and coatings, such as are employed in the treatment of thermal burns, is strongly condemned by them in the treatment of dichlorethylsulphide injuries. The principle of excluding the air for the purpose of lessening pain in the treatment of thermal burns is not applicable here because of the relative anesthesia of the dichlorethylsulphide lesions in their earlier stages. Exceptions to the above rule are the sodium stearate impregnated with chloramine-T and the chlorcosane solution of dichloramine-T, as in these cases there is an active and persistent germicidal agent present. In the case of denuded surfaces with much pain and when bedsores have developed, the colloidal saline bath is strongly advocated. This bath is made as follows: Dissolve one pound of commercial cornstarch and one pound of sodium bicarbonate in 20 to 30 gallons of sterile physiologic salt solution at a temperature of 90° to 95°. The patient can be left immersed in this, when necessary, from 15 minutes to 48 hours. The patient should be constantly watched by the nurse. Should pulse become weak, give strychnin or digipuratum or any other active digitalis preparation, or remove from bath, and apply blankets and heat.

*Mild Conjunctivitis.*—Avoid pressure from heavy compresses or tight bandages. Cold compresses of saturated boric acid constantly applied without pressure for 12 to 24 hours or longer, or hot vapor eye baths relieve the pain and discomfort, particularly the feeling of "sand in the eyes," and reduce the congestion. Personal experience leads the authors to recommend highly the use of a 0.5 per cent solution of dichloramine-T in chlorcosane both as a prophylactic and therapeutic measure for the ocular conditions.

*Mild Respiratory Lesions.*—For the mouth and throat conditions a weak Dakin's or a .25 to .50 per cent chlorazene solution. For the aphonia use ice bag externally, and steam inhalations, with or without compound tincture of benzoin.

*Severe Injuries.*—When necrosis of the skin, more or less extensive develops, follow the same line of treatment given above: full bath, irrigation, slush or sponge bath, or wet packs of Dakin's solution, alternating with physiologic and hypertonic salines, or the colloidal bicarbonate bath should be constantly employed. When the severe lesions are upon the shoulders, buttocks, etc., the greatest care must be taken to avoid bedsores, as they will develop very quickly. For this purpose the constant colloidal or saline bath, with patient hung in canvas body cradle to take off pressure should be used. The cradle also gives increased facility in handling. It is of the greatest importance to protect the damaged areas from secondary trauma.

Where decubitus or sloughs occur the necrotic layer should be removed, either with sterile forceps or by means of frequent hot irrigations under pressure. For this purpose saline, Dakin's, 1:10,000 potassium permanganate solution, etc., should be used. If the necrotic areas have become infected through neglect or improper treatment, the use of Dakin's or a similar solution should be pushed, alternating with hypertonic saline baths. A hyperchlorous solution made according to Carrel's method can be applied here with good results:

To one liter of water add 12.5 grams of bleaching powder, shake vigorously, then add 12.5 grams of boric acid powder, and shake again. Allow the mixture to stand for some hours, preferably overnight, then filter off, when the clear solution is ready for use. This solution contains about .54 per cent of hypochlorous acid, 1.28 per cent calcium biborate and .17 per cent calcium chloride. This is about the most practical concentration of hypochlorous acid, as stronger solutions rapidly lose strength.

When the patients are very weak, temperature rising, and infection progressing it may be advisable to employ tepid sponge baths of above solutions.

*Complications.*—Shock may develop immediately after the exposure but is usually not as severe as in thermal burns. Treat as in surgical shock.

*Kidney.*—From the time of exposure fluids should be forced

to dilute the urine and lessen renal damage. When there is severe shock and excessive vomiting use Murphy drip. Use a low protein salt-free diet. When a hypertonic bath or irrigation is used great care must be taken to keep up the intake of water and prevent concentration of urine. Sodium bicarbonate may be given internally. The strengthening of the cardiac function increases the urinary output. The use of digipuratum is apparently of value here, according to our experience with human cases.

*Heart.*—The heart rate is usually 120-140, and there is some ventricular dilatation, probably with little or no myocardial degeneration (as shown by autopsy). The use of active digitalis compounds is here indicated. Digipuratum in doses of 1.5 grams 3 to 4 times daily seemed of benefit in our cases.

*Lungs.*—For the primary bronchial and pulmonary lesions there is no specific treatment. For the secondary pneumonias (infective) proceed according to the type of infecting organisms, which is likely to be the streptococcus.

*Gastrointestinal.*—Use liquid low protein diet. Sodium bicarbonate as indicated.

*Furnuculosis.*—In the majority of severe dichlorethysulphide injuries there develops about the second or third week a more or less widespread, often generalized furnuculosis, usually beginning deep in the necrotic hair-follicles, and due to a staphylococcus pyogenes aureus infection. The furuncles range in size from miliary pustules to large painful boils. The large ones should be opened and drained, and a stock staphylococcus vaccine, or, if possible, an autogenous vaccine, should be given in large doses, 1 billion every third day for four injections.

*Severe Eye Injuries.*—Experimental evidence seems to indicate that the use of 5 per cent solution of dichloramine-T in chlorcosane lessens the injuries to cornea and conjunctiva, and prevents secondary infection. The use of atropine is indicated in case of involvement of the iris. The development of a chronic conjunctivitis should be prevented by the wearing of tight-fitting (but without pressure upon eyelids), antidimming goggles. The increase in refractive error or reduction of vision shown in many of the chronic irritated eyes did not respond to any treatment employed. The patient should be referred to a competent ophthalmologist for appropriate examinations and treatment for these conditions.

In the treatment of the eye lesions the use of argyrol, silver and other silver preparations, as well as cocain, is considered unwise.

*General Toxic Action.*—No evidences of a toxic action upon the internal organs have been seen in any of the lesions of mustard gas produced by direct application or by exposure to its vapor. Clinical studies, as far as carried out, show increased blood urea, decreased urea- and chloride-output, decreased quantitative urinary output, and increased specific gravity, with increased acidity. The toxic symptoms observed could be explained as the result of the skin destruction, damage to the respiratory tract, secondary infection, decubitus, with resulting absorption, etc. In the earlier stages symptoms of severe shock may be present. Treatment of these conditions should be carried out according to general principles.—(*Jour. Lab. & Clin. Med.*, Oct., 1918.)

## Methods of Dealing With Hernia in the Army.

So many men otherwise able-bodied and of military age are afflicted with hernia, a condition which in early life is now regarded as safely and entirely remediable, that the question of selection and assignment to active surgery has arisen with the country at war and has been settled in various ways. It will be remembered that according to the last instructions of the Provost Marshal General all cases of hernia are placed in the deferred or remediable class and are subject to call on order of the War Department. In England men are inducted into the service, radically cured, and put on active duty. Canada first tried this plan, but was so cursed by complaints of those thus treated as to the effect of operation that these cases are now grouped in the deferred class, given trusses, and are assigned to home duty. In England, Hull, who is in charge of the Hernia Department, states that trusses are not a satisfactory solution of the matter so far as the soldier is concerned. His operative material is not large, about 500, and yet his technique is extremely simple, based as it is on the concept that hernia is, in men of military age, nearly always due to the presence of a congenital sac. Indeed, he states that much of the trouble following the operation for radical cure of hernia and many of the recurrences are due to well-intentioned but ill-advised efforts of the surgeons to effect repair. His method consists in removing the sac at its highest possible level with a minimum disturbance of tissues, which is followed by an extremely rapid convalescence without reaction. He attacks the hernia from within the sac through an inch incision. He thus describes it:

The operation is performed under local anesthesia as a routine measure. An incision from half an inch to an inch in length is made over the needle puncture and carried down to the aponeurosis of the external oblique. The fibers of the external obliques are split for a distance of half an inch. The opening in the external oblique should lie directly over the spermatic cord. The cremasteric and spermatic fascial coverings of the cords are drawn through the aperture of the external oblique. The cremasteric fibers are separated and the spermatic fascia incised. The sac is then found lying inside these coverings. Two pairs of fine hemostatic forceps are placed upon the edge of the sac, and an incision half an inch in extent is made between them by a snip of a pair of scissors. The two layers of the sac forming the lips of the aperture are now clipped with hemostatic forceps. The aperture can now be held open by four pairs of forceps, and four incisions are made, one between each pair of forceps, enlarging the aperture sufficiently to display the interior. If omentum lies in the sac it is drawn out, ligatured, and cut off. The interior of the sac presents for examination two apertures, one the internal ring passing into the abdomen, the other passing down the inguinal canal. These apertures are separated from one another by a process of peritoneum, the "crista," and in a well-marked case the apertures resemble the muzzle of a double-barreled shotgun.

The process of peritoneum called the crista corresponds to the internal margin of the internal ring. Forceps are clipped on to the crista in one or two places. It is now necessary to separate the important tube leading down the inguinal canal. This is done by cutting along the crista to the mesial side of the forceps, and dividing one layer of peritoneum with scissors. As the result of this incision the neck of the sac now lies clear, held by the forceps on the outer side of the sac. The neck of the sac has in this way been completely exposed and freed without dissection. A gauze swab is gently passed down the outer and inner side of the sac. A gentle pull is then made upon the neck of the sac whilst it is ligatured as high up as possible. By separating the crista forming the neck of the sac in the manner described, and pulling upon the sac, it has become possible to ligature the peritoneum forming the neck of the sac, about 2 inches above the internal ring. When the sac is cut off distal to the ligature, the elasticity of the peritoneum will displace the ligatured sac well behind the rectus muscle. In cases in which a large internal ring or very thin peritoneum renders a recurrence more possible, the conjoined tendon is drawn over the cord and sutured to Poupart's ligament without enlarging the wound.

Coley's comment on Hull's operation is as follows:

"In view of the fact that in the Bassini operation we have a procedure that has been well tried out, that has stood the test of now nearly 30 years of world-wide experience, that has given in the hands of skilled operators 95 to 99 per cent. of permanent cures, I believe we are hardly justified in abandoning the Bassini operation and substituting in its place the operation advocated by Colonel Hull until we have further data as to the permanence of the results. Moreover, I can see very little to be gained by such substitution. The Bassini operation can be performed perfectly well under a local anesthetic; it can be performed by skilled operators in from eight to fifteen minutes, and it does not require more than ten days or two weeks of confinement in bed. Colonel Hull states that if a patient has a recurrence following his operation, then the Bassini operation can be perfectly well performed. Just how many cases have required this second operation he fails to state.

"Aside from the fact that the length of the skin incision is of minor moment, that small incisions always imply more deep trauma than do large, that the neck of the sac cannot be exposed in the simple way described, and that through such a cut placed as indicated to suture the conjoined tendon to Poupart's ligament would be difficult and uncertain; it is quite true that many of the hernias in young men require for their cure only the removal of the sac, since the condition is dependent not upon muscular weakness or a weak attachment, or fascial relaxation, but solely and entirely upon the presence of a hernial sac. In those cases of direct hernias which are observed in older men, and in those cases in which the hernia is due to the narrow attachment of the internal oblique and transversalis to Poupart's ligament, apparently such a procedure as described by Hull would seem entirely inadequate. The proof of the method, however, lies in its clinical test. Until many more cases are reported it would be unwise to draw conclusions as to the value or the reverse of this procedure. It is probable that this method will not become a routine one, although there can be no doubt that in certain instances it will be highly expedient and entirely efficacious."—(*Ther. Gaz.* Sept. 1918.)

# Diagnosis and Treatment

## The Treatment of Severe Relapsing Cases of Malaria.

The routine treatment by oral quinin of all cases of malaria admitted to the medical division of a general hospital was found to be attended by a high incidence of relapses and the development, in a large proportion of the severe cases, of a progressive degree of cachexia by Drs. Gunson, Winning, Johnstone, Porter and Scott, of the British Army. In order to test the efficacy of the intramuscular and, later, of the subcutaneous administration of quinin, successive groups of patients were treated by these methods. No appreciable lessening in the incidence of relapses resulted, but immediate and marked improvement in the general condition and nutrition of the patients invariably occurred from the more intensive forms of treatment, while the severity of the relapses became reduced and the duration of pyrexia less prolonged. At the suggestion of Sir Ronald Ross, K. C. B., another series of patients was divided, for quinin treatment, during the apyrexic period, into three groups: one-third received oral quinin gr. 20 daily; one-third quinin gr. 20 on Saturday and Sunday; the remaining third were given no quinin. It is necessary to emphasize the fact that the cases treated by intramuscular and subcutaneous quinine courses were all examples of severe relapsing malaria, some being under treatment for six months before they were evacuated, having been observed continuously from the initial attack; cases admitted subsequently were much less severe.

The following routine treatment by oral quinin is the routine originally adopted:

On admission: Bed. Aperient if necessary—i.e., if not given within 24 hours prior to admission. Quinin gr. 20 by mouth. Blood film to laboratory for examination in special cases. No dietary extras.

Mild cases: (i.) *Apyrexic.* Q. gr. 20 by mouth daily in one or two doses, with iron tonic twice daily. (ii.) *Pyrexic.* Q. gr. 45 daily, reduced to gr. 30 when temperature normal for two days; later to gr. 20 daily in one or two doses, with iron tonic twice daily till discharged.

Severe cases: I.M.Q. gr. 20, repeated S.O.S.; subsequently by mouth gr. 45 daily; reduced to gr. 30 when temperature normal for two days, later to gr. 20 once daily, with iron tonic twice daily, till discharge.

The results of this treatment are shown in Table I.

TABLE I.

*Analysis of* 328 *Cases Diagnosed Malaria under Observation* 23/12/17.

Number under treatment with oral quinin.....328
Number of relapsing cases under observation..... 98
Percentage of relapsing cases under treatment..... 30

*Details of* 91 *relapsing cases.*

| | | Averages. | | | |
|---|---|---|---|---|---|
| Type. | No. | Age. | Relapses observed. | Daily dose of quinin at time of relapse. | Period under observation (weeks). |
| M.T. ..... | 34 | 32 | 3 | Gr. 25 | 7 |
| B.T. ..... | 9 | 28 | 2½ | Gr. 23 | 6 |
| Neg., average neg., B.F... | 32 | 27 | 2 | Gr. 25 | 8 |
| Clin. (no B.F.) ..... | 16 | 31 | 2 | Gr. 25 | 5½ |
| Total..... | 91 | 30 | 2½ | Gr. 25 | 7 |

It was noted that the incidence of severe cases among patients who had previously suffered from dysentery was greater than in other patients, and in several cases there was a relapse of dysentery during or shortly after a malarial attack, dysentery organisms being isolated from the stools.

*Effect of Single Daily Intramuscular Injections of Quinin.*

This treatment materially improved the general condition of the patients, but as relapses were still very frequent (see Table II.) more intensive treatment was employed.

TABLE II.

*Incidence of Relapses after a Course of Single Intra-Muscular Injections (Average Number, 6) of Quinin Gr. 18 to 24.*

*Thirty-Four Successive Cases.*

| Type of Case. | Number of cases treated. | Number relapsing within four weeks. | Average period of relapse after cessation of course. |
|---|---|---|---|
| M.T. ..... | 20 | 14—70% | 13th day |
| M.T. and B.T..... | 1 | 0— 0% | |
| B.T. ..... | 2 | 1—50% | 14th day |
| Neg. B.F., or clin.... | 11 | 4—36% | 15th day |
| | 34 | 19—56% | 14th day |

*Intensive Treatment.*

This consisted of a course of quinin, gr 60 (intramuscular 20, oral 20, intramuscular 20), daily for four days, *repeated after* 10 *days.*

In 24 hours there was in all cases a distinct improvement, and in 3-4 days the condition cleared up except for a little local hardness which also gradually disappeared in the course of a further 7 or 8 days.

The opinion was formed that this condition was of the nature of an aseptic reaction to a chemical irritant and whereas the series of injections producing this result had all been given in a narrow zone 1½ in. to 2 in. below the iliac crest, it was decided to utilize in the next course more of the available area of muscular tissue. It was also thought that the sacral and lumbar edema was to be explained by the fact that the injections had been made into a comparatively thin layer of muscular tissue closely shut in by bone, fascia lata, and the attachment of the latter to the crest of the ilium. It was therefore satisfactory to find that the next course of injections spread over a considerably larger area in the same patients was attended only by a slight degree of local reaction.

In the earlier cases the method of sterilization of needles and syringes was that of boiling in water, but the needles quickly became blunt and their surfaces rough and eroded and occasionally a syringe cracked.
to avoid unnecessary pressure.

*Symptoms and signs.*—The symptoms and signs presented by 12 successive cases were as tabulated.

*Symptoms and Signs Presented by* 12 *Successive Cases.*

| | | Spleen. | | Symptoms and sensations. | |
|---|---|---|---|---|---|
| No. | Appearance. | Prior to course. | After course | During course. | After course. |
| 1 | Anemic. | 2 in. below C.M.; tenderness. | Normal; no tenderness. | Headache, deaf (old trouble one ear), tinnitus. | Feels very well; previous symptoms gone. |
| 2 | Anemia and cachexia marked. | 1 in. below umbilicus; tenderness. | " | Tinnitus, sweating, headache nausea (not deaf). | Feels well; much better than before I.M.Q. |
| 3 | Anemic. Skin pigmented "since being gassed." | Not felt but marked tenderness on palpation. | A.Ax.L., 8th R., C.M.; no tenderness. | Vomited twice; slight headache, tinnitus, sweating. | Feels exceptionally well between courses of I.M.Q. and after. |
| 4 | Anemic; sallow. | Felt; tenderness. | Not felt; dullness normal; no tenderness. | Headache, sweating, nausea, gradual rise of T. to 100° | Feels well; previous symptoms gone. |
| 5 | Fair color. | 1 f.b. below C.M.; tenderness. | Not felt; dullness normal; no tenderness. | Headache, sweating, deafness. | Feels well; no symptoms. |
| 6 | Good color. | Palpable; tenderness. | " | Bad headache, nausea. | Feels very well. |
| 7 | Thin, cachectic, anemic. | 2 in. below C.M. | 1 in. in front A.Ax.L., 1 in. below N., 3 in. below C.M.; tenderness. | "Felt ill." Headache, nausea; vomited; pain in back and L. side. | Much better. |
| 8 | Anemic. | Palpable; tenderness. | A.Ax.L., 7th R., C.M.; tenderness. | Sweating, nausea, headache, tinnitus. | Very well. |
| 9 | — | Not palpable; tenderness. | Normal; no tenderness. | Tinnitus slight deafness, and nausea. | " |
| 10 | — | Palpable. | " | Headache, deafness, nausea, tinnitus. | " |
| 11 | Anemic. | Enlarged; tenderness | " | Slight deafness, nausea, tinnitus. | " |
| 12 | " | Enlarged. | Normal. | Deafness, tinnitus, loss of appetite, headache. | Feels well. |

R., rib. N., nipple. N.L., nipple line. C.M., costal margin. A.Ax.L., anterior axillary line.

*Pyrexia.*—Several types of pyrexic reaction were observed as a result of the intensive course.

*Subsequent Effect of Intensive Treatment.*

*General Condition.*—Improvement in the general condition was immediate, progressive, and marked. The appetite improved; cachexia disappeared; the patient put on flesh and gained strength rapidly.

Pyrexia.—The pyrexia was completely controlled in practically all cases for a period of two or three weeks, when relapses occur in 44 per cent. of the cases.

TABLE III.

*Incidence of Relapses after an Intensive Course of Quinin, Grains 60 Daily (I.M.Q. 20, O.Q. 20, I.M.Q. 20), for Four Days Repeated after Ten Days' Interval, no other Quinin being Given (except in Three Cases, all of which Relapsed) after the First Course Ceased.*

*90 Successive Cases.*

| Type. | Number of cases treated. | Number relapsing within four weeks.* | Average period of relapse after cessation of 2nd course. |
|---|---|---|---|
| M.T. ..... | 38 | 20=52% | 15th day |
| M.T. and B.T..... | 4 | 3=75% | 20th day |
| B.T. ..... | 28 | 13=46% | 19th day |
| Clin. or neg. ..... | 11 | Nil= 0% | |
| | | 36=44% | |
| *Single Course* (2nd course not given because of marked improvement). | | | |
| M.T. ..... | 7 | } | |
| B. T. ..... | 2 | } No relapses. | |
| | 90 | | |

*A few cases were observed for less than four weeks after 2nd course.

The relapses occurring after two intensive courses were, however, as a rule, considerably less severe, and were accompanied by less constitutional disturbance, the patients appearing to offer an increased resistance to the attack. In certain cases, previously the subjects of frequent and

(*Continued on p* 22)